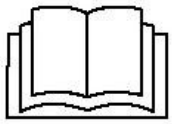
Operation and programming manual

	**BEFORE PLACING MINIACTION SERIES SERVO DRIVES INTO SERVICE, CAREFULLY READ THE INSTALLATION AND OPERATION MANUAL, AND FOLLOW ALL INSTRUCTIONS TO ENSURE MAXIMUM SAFETY**

GB

SERVO DRIVES/INVERTERS

MINIACTION SERIES 300 AND 500

	If the user effects modifications of mechanical and/or electrical parts supplied by Minimotor s.r.l. and such modifications are not included in these instructions (that is, such modifications are for using this quasi-machine in ways that do not conform to its intended use), Minimotor s.r.l. can no longer be held responsible for meeting the essential safety and health requirements for the supplied materials dealt with in this manual.
	The technical information and drawings contained in these assembly instructions may have been modified at a later time. Therefore, please see the latest versions of the technical drawings.
	Using the machine in ways that do not conform to its intended use, as described in this manual, is strictly prohibited. The technical information and drawings contained in this manual may have been modified at a later time. Therefore, please see the latest versions of the technical drawings or diagrams for the groups or systems comprising the machine.

TABLE OF CONTENTS

1 PREFACE

The purpose of this manual is to provide the information required for operating and programming Miniaction series 300 and 500 servo drives/inverters. The control parameters and procedures are also described.

User	The user is the person, agency or company that purchased the machine and plans to use it for the purposes it was designed to fulfil.
User/operator	The user operator is the person authorised by the user to work with the machine.
Specialised personnel	These are persons who have specifically studied servo drives and who are able to recognise the hazards involved in using them, and can thus avoid such hazards.

These instructions must be made available to all the persons or organisations indicated above.

Both the parameters and the procedures are marked with a number that identifies them individually.
Unlike the parameters, the procedures involve the performance of certain specific operations and may take more time to execute than the procedures required for configuring a parameter. In this manual, a procedure and/or parameter is referred to by indicating its number (For example, 32771) and the position in the hierarchical structure of the menus if the keyboard should be used (For example, 1.3.8).
For greater clarity, in addition to the information described above, a string of text displayed by the keyboard may also be specified (For example, I TIME LIMIT).

2 I/O IDENTIFICATION

2.1 Association of digital inputs

The MINIACTION 2300/500 servo drive is equipped with 16 digital inputs. Their name, location and a brief description are listed on the following table:

Association of digital inputs		
Digital input	**Name**	**Description**
Digital input #1	T1_IN	Profile selection input 1
Digital input #2	T2_IN	Profile selection input 2
Digital input #3	T3_IN	Profile selection input 3
Digital input #4	T4_IN	Profile selection input 4
Digital input #5	T5_IN	Profile selection input 5
Digital input #6	T6_IN	Profile selection input 6
Digital input #7	T7_IN	Profile selection input 7
Digital input #8	T_ENABLE	Enabling input
Digital input #9	V_ENABLE	Speed enabling input
Digital input #10	JOG_CW	Clockwise jog operation input
Digital input #11	JOG_CCW	Anti-clockwise jog operation input
Digital input #12	LIMIT_SWITCH_CW	Clockwise end-of-travel input
Digital input #13	LIMIT_SWITCH_CCW	Anti-clockwise end-of-travel input
Digital input #14	STROBE	Profile execution input
Digital input #15	HOME_SW	Home position input
Digital input #16	DIR_IN	Direction input

For a detailed description of the electronics, see the Operation and Installation Manual.

2.2 Assignment of digital outputs

The MINIACTION 300/500 servo drive is equipped with five digital outputs that may each be assigned a specific function by the user.

The function associated with an output can be selected with parameters 35158 to 35162 on menus 1.12.27 to 1.12.31.

See the subsequent description of the parameters and see Table C for configuring the digital outputs.

The MINIACTION 300/500 servo drive is also equipped with a digital output assigned for controlling a holding brake. This output can be configured using parameters 32966, 32967, 32968, 32969, 32970, 32971, 32978 and 32979 from menus 1.13.1 to 1.13.8, respectively.

For a detailed description of the electronics, see the Operation and Installation Manual.

2.3 Analogue inputs

The MINIACTION 200/500 servo drive is equipped with two analogue inputs: a 0-10 V analogue voltage input and a 4-20 mA analogue current input.

The analogue inputs can be used to receive an external analogue reference signal for calculating the desired reference speed or torque.

Each analogue input has an offset threshold that can be set by the user. If the signal on the analogue input is lower than the relative offset value, the input is considered to be null.

The analogue inputs can be enabled individually and independently. The active analogue input is selected using parameter 35136, ANALOGUE IN SOURCE on menu 1.12.1;

The 0 value enables the 0-10 V analogue voltage input. The 1 value enables the 4-20 mA analogue current input.

The analogue value on the voltage input is considered to be null until the offset threshold is reached, as set by programming parameter 35137 IN OFFSET [mV] on menu 1.12.3; if this value exceeds 10 volts, it is considered to equal 10 volts.

Similarly, the analogue value on the current input is considered to be null until the offset threshold is reached, as set by programming parameter 35138 IN OFFSET [mA] on menu 1.12.2; if this value exceeds 20 mA, it is considered to equal 20 mA.

The reference torque or speed is obtained in a linear manner from the analogue value on the selected analogue input, by assigning a minimum reference value to the minimum value on the input.

If the analogue input is used to generate a reference speed, the minimum value on the input corresponds to the minimum reference speed, which can be set by programming parameter 35140 SPEED MIN VALUE on menu 1.12.7.

The reference speed varies linearly with the analogue input until the maximum value that the input can be assigned, which corresponds to the reference speed programmed with parameter 35139 SPEED MAX VALUE using menu 1.12.6.

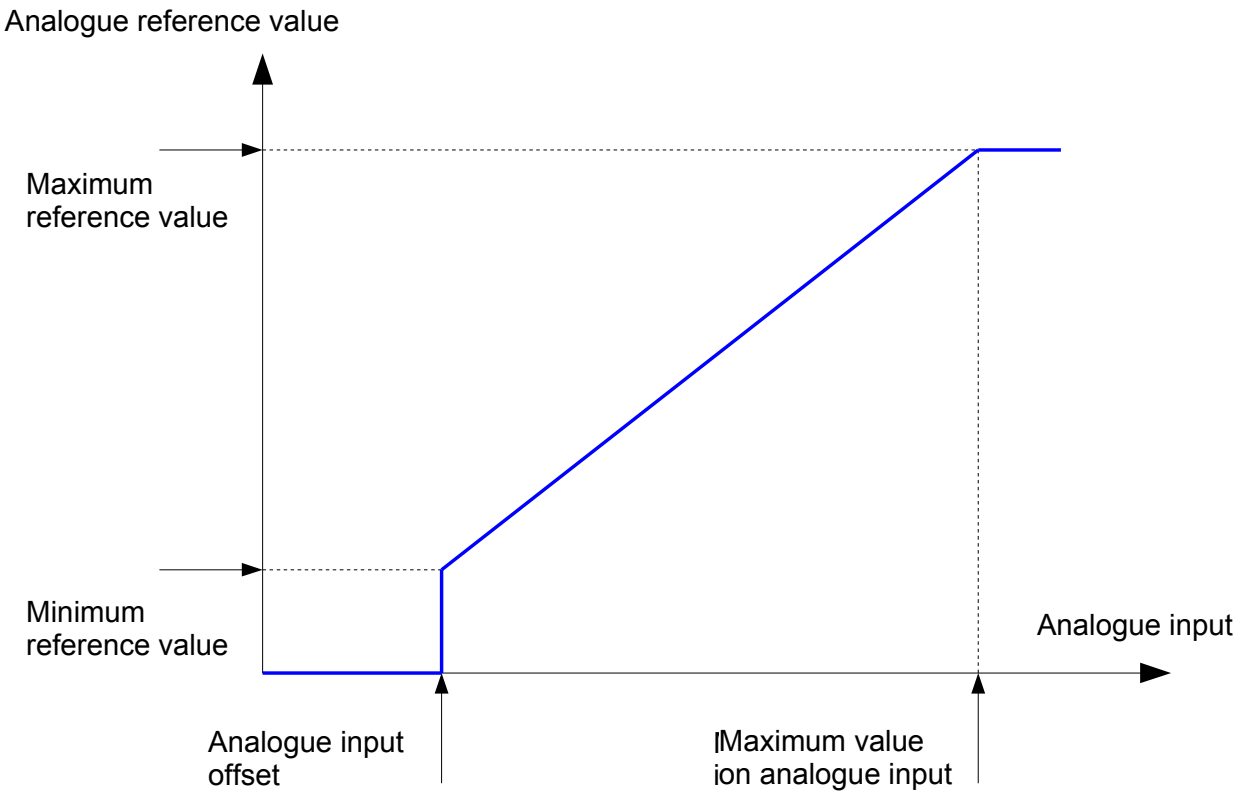
If the analogue input is used to generate a reference torque, the minimum value on the input corresponds to the minimum reference torque, which can be set by programming parameter 35142 TORQUE MIN VALUE using menu 1.12.5.

The reference torque varies linearly with the analogue input until the maximum value that the input can be assigned, which corresponds to the reference torque programmed with parameter 35141 TORQUE MAX VALUE using menu 1.12.4.

The current input can handle signals ranging from 0-20 mA, and the offset value on the current input can be set from 0 mA upwards. As a result, no error is signalled if the analogue current on the analogue current input is lower than 4 mA.

The reference torque is expressed in mA if a synchronous motor is being controlled. In this case, the torque delivered is proportional to the current value of reference obtained as described above.

The reference torque is expressed in RPM if an asynchronous motor is being controlled. In this case, the torque delivered is proportional to the shift; that is, to the difference in rotation speed between the rotor and the electric field generated by the servo drive.



Analogue current inputs				
Active motor control parameter 35165	**0; Motor torque cont\rol**		**1; Motor speed cont\rol**	
Active analogue input parameter 35136	**0; 0-10 V**	**1; 4-20 mA**	**0; 0-10 V**	**0; 0-10 V**
Analogue input	Voltage [mV]	Current [mA]	Voltage [mV]	Current [mA]
Analogue input offset	Parameter 35137 IN OFFSET [mV] menu 1.12.3	Parameter 35138 IN OFFSET [mA] menu 1.12.2	Parameter 35137 IN OFFSET [mV] menu 1.12.3	Parameter 35138 IN OFFSET [mA] menu 1.12.2
Maximum value on analogue input	10,000 mV	20.000 mA	10000 mV	20.000 mA
Analogue reference value	Current [mA] - Shift[rpm]		Speed [rpm]	
Minimum reference value	35142, TORQUE MIN VALUE, menu 1.12.5		35140, SPEED MIN VALUE, menu 1.12.7	
Maximum reference value	35141, TORQUE MAX VALUE, menu 1.12.4		35139, SPEED MAX VALUE, menu 1.12.6	

2.4 Analogue output

The MINIACTION 300/500 servo drive is equipped with an analogue output that can be configured by the user by programming parameter 35105, OUT SOURCE on menu 1.12.8.

This parameter is used to select the operating mode for the 0-10 V analogue output. The following options are possible:

0: NONE Analogue output disabled.

1: SPEED The analogue output is associated with motor speed regardless of direction of rotation. The voltage on the analogue output reaches its maximum value when rotation speed is equal to the speed set with parameter 35106 on menu 1.12.9.

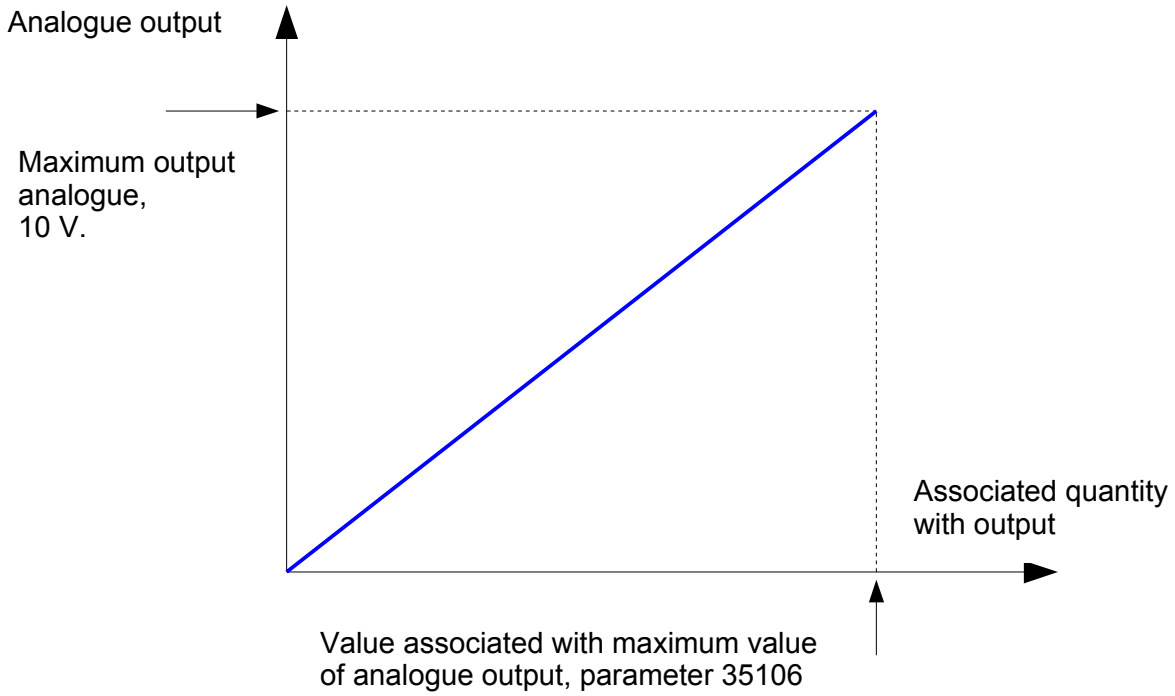
2: CURRENT The analogue output is associated with current supplied to the motor regardless of direction of rotation. The voltage on the analogue output reaches its maximum value when the current supplied to the motor is equal to the current set with parameter 35106 on menu 1.12.10.

3: MB OUT The voltage on the analogue input is set with modbus register 24.

The voltage on the analogue input is set to 0 V when modbus register 24 is set to 0.

The voltage on the analogue input is set to 10V when modbus register 24 is set to 10000.

When the voltage on the analogue output is associated with rotation speed or current supplied to the motor (parameter 35105, menu 1.12.8 = 1 or 2), the analogue output is generated according to the following relationship:



3 POSITION MANAGEMENT

In order to execute positioning, the drive must be connected to a position feedback sensor (encoder or resolver) installed on the motor.

The drive converts the detected position with an internal resolution of 65536 steps/motor turn.

To make it easier to understand how distances are managed, the drive can express them in a measurement unit that is programmed by the user. The conversion ratio from internal unit to user unit is set with parameters 35115 POS RATIO NUM on menu 1.3.14 and 35117 POS RATIO DEN on menu 1.3.15.

Using the programmed conversion ratio, the drive expresses distances in the user-selected unit in the maximum resolution that can be displayed.

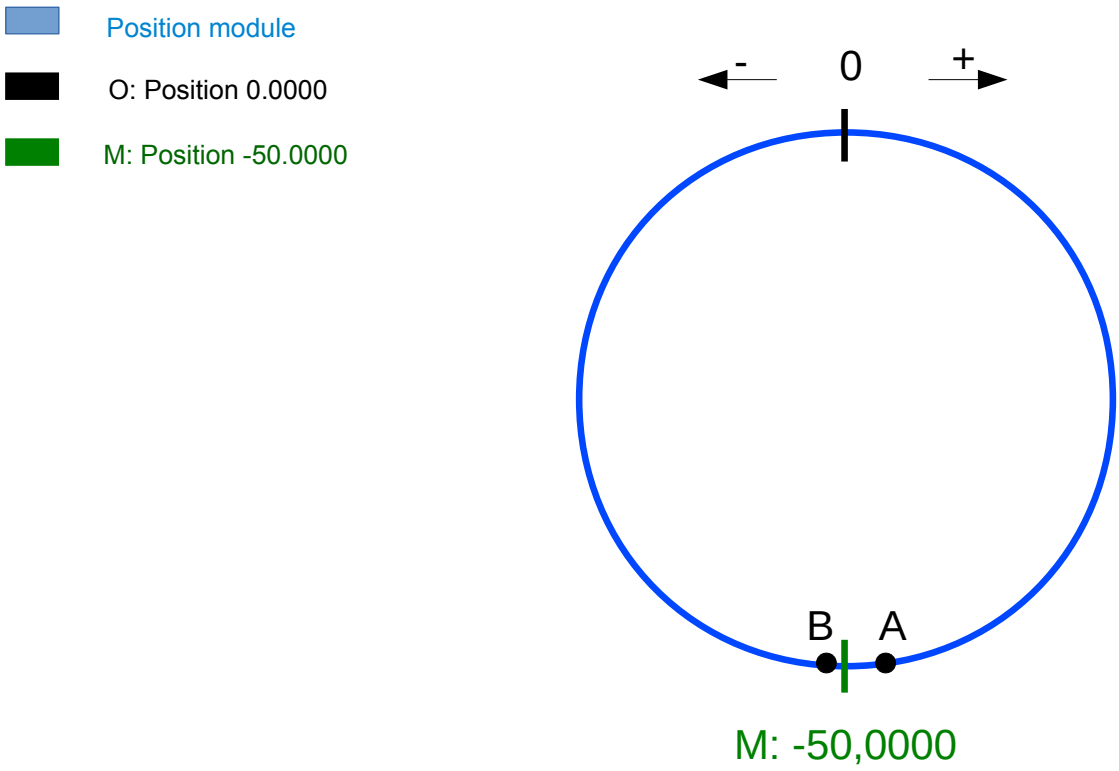
The conversion factor also affects the maximum value that can be assumed by the distances and by the position module: parameter 35169, POSITION MODULE on menu 1.3.16.

The position module can be programmed by the user with the desired value up to a maximum value (expressed in the user-selected unit) that corresponds to approx. 65535 motor revolutions.

The distances can assume a value ranging from -module/2 to +module/2. For example (default condition), if the mechanical revolution of the motor is chosen as the position unit (numerator = 655360000, denominator = 10000, internal position = 1 revolution * 65536 / 1 = 65536 pulses) and 100 is set as the position module (equivalent to the machine cycle), the position distances range from -50.0000 to 49.9999.

For example, if the motor rotates three times clockwise to distance A = 48.0000 (default position), the resulting distance B = -49.000.

Graphically speaking:



If an absolute movement is performed, the motor is positioned at the reference distance without travelling beyond point M.

If a relative movement is performed, the distance that the motor moves from the reference position is equal to reference distance.

If a short type of movement is performed, the drive considers the requested distance to be absolute and executes a movement in the direction that results in the shorter run performed within the machine cycle.

If a clockwise movement is performed, the drive considers the requested distance to be absolute and executes a positive movement. If the reference distance exceeds the current position, the motor is moved in the positive direction until the reference distance is reached.
If the reference distance is less than the current position, the motor is nonetheless moved in the positive direction until it travels beyond point M and then reaches the reference distance.

If an anti-clockwise movement is performed, the drive considers the requested distance to be absolute and executes a negative movement. If the reference distance is less than the current position, the motor is moved in the negative direction until it reaches the reference distance.
If the reference distance exceeds the current position, the motor is nonetheless moved in the negative direction until it travels beyond point M and then reaches the reference distance.

4 MOTOR CONTROL METHODS

The MINIACTION 300/500 servo drive can apply two methods of controlling the motor, as follows:

- Torque
- Speed
- Absolute positioning
- Relative positioning
- Search for home position
- Positioning with short travel
- Positioning with clockwise movement
- Positioning with anti-clockwise movement
- Pulse-direction tracking

4.1 Torque

4.1.1 Synchronous motor

Mechanical torque is proportional to current in a synchronous motor and are associated with each other by the torque constant, which is a characteristic parameter of the motor.

To control torque, the servo drive sets motor torque as required by the reference signal. This operation is equivalent to inducing the motor to draw the desired current.

If the torque output set for the motor is lower than the torque it is generating, it accelerates to the maximum programmed speed.

When the motor reaches maximum programmed speed, the servo drive reduces the current (and thus the torque delivered by the motor) while maintaining speed at the maximum value.

4.1.2 Asynchronous motor, V/f control

In an asynchronous motor, the torque delivered is proportional to the slip. Torque control is achieved by setting the slip to the value programmed by the user, until the maximum programmed speed is reached.

When the motor reaches maximum programmed speed, the servo drive reduces the slip (and thus the torque delivered by the motor) while maintaining speed at the maximum value.

Torque control is only possible when a position feedback device (encoder or resolver) is installed on the motor.

Torque control is characterised by three parameters:

Reference torque	Synchronous motor: This value is the current supplied to the motor without imposing a delay and/or ramp on the motor. Asynchronous motor, V/f control: This value is the current delivered without imposing a delay and/or ramp on the motor.
Maximum speed	This is the maximum speed the motor is allowed to reach; when this speed is reached, the current supplied to the motor is limited.
Direction of rotation	This is the direction in which torque is applied to the motor

4.2 Speed

To control speed, the servo drive sets motor speed as required by the reference signal.
If motor speed is lower than the speed required by the speed reference signal, the motor is accelerated to the maximum programmed speed.
If motor speed is higher than the speed required by the speed reference signal, the motor is decelerated to the required speed.
Acceleration and deceleration are expressed in milliseconds and are associated with a speed value as follows:

Acceleration [rpm/ms] = Acceleration speed [rpm] / Acceleration time [ms]

Deceleration [rpm/ms] = Deceleration speed [rpm] / Deceleration time [ms]

Speed control is characterised by six parameters:

Speed reference	This value is required motor speed
Acceleration time	This value, expressed in milliseconds, is the time required to accelerate from zero to the *acceleration speed*
Acceleration speed	This value, expressed in RPM, is the time referenced to the *acceleration time*
Deceleration time	This value, expressed in milliseconds, is the time required to decelerate from the *deceleration speed to zero speed*
Deceleration speed	This value, expressed in RPM, is the time referenced to the *deceleration time*
Direction of rotation	This is the direction in which torque is applied to the motor

4.3 Position

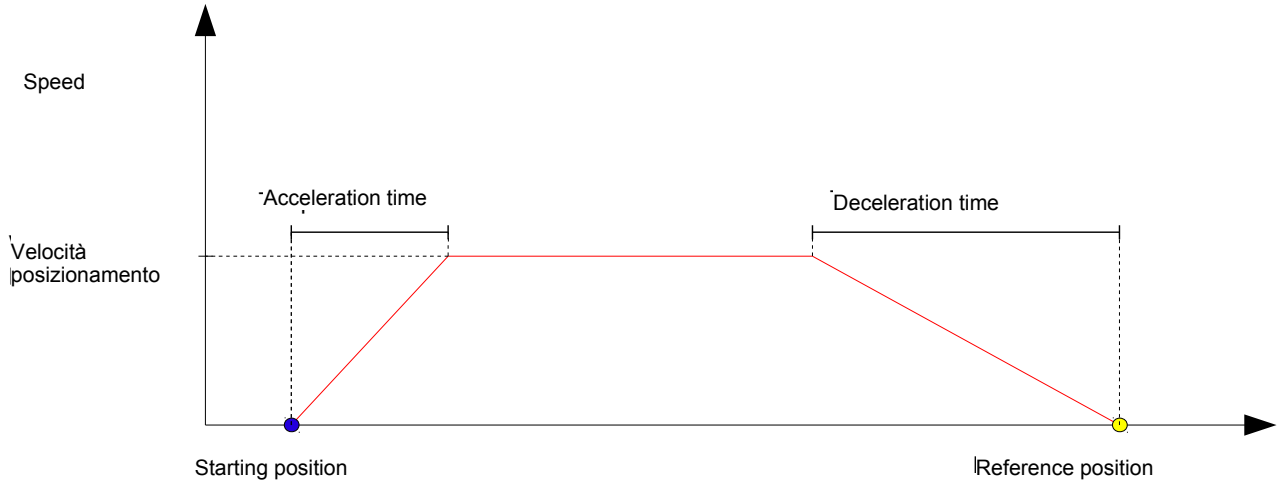
Regardless of the type of positioning carried out, which affects only the final distance to be reached: during position control, the drive moves the motor according to a trapezoidal speed profile until it reaches the reference position.

If positioning is absolute, the reference position is acquired immediately.

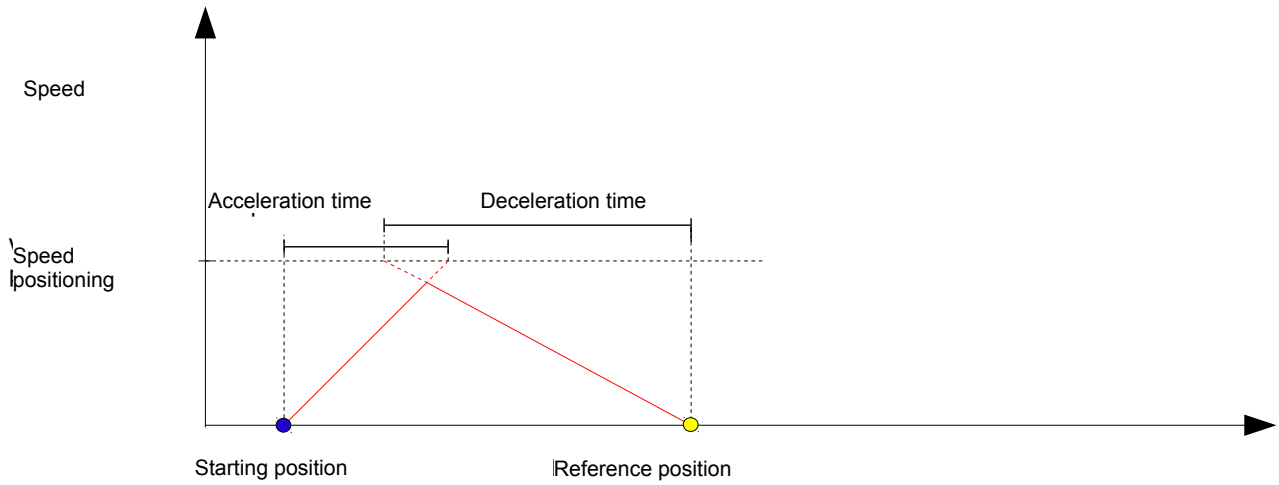
If positioning is relative, and if the requested relative position control is in response to a previous positioning command, the reference position is obtained by adding the specified movement to the previous reference position.

If positioning is relative and is requested after an uncontrolled movement to position (for example, after operation with speed or torque control), the movement is executed by adding the desired movement to the current position.

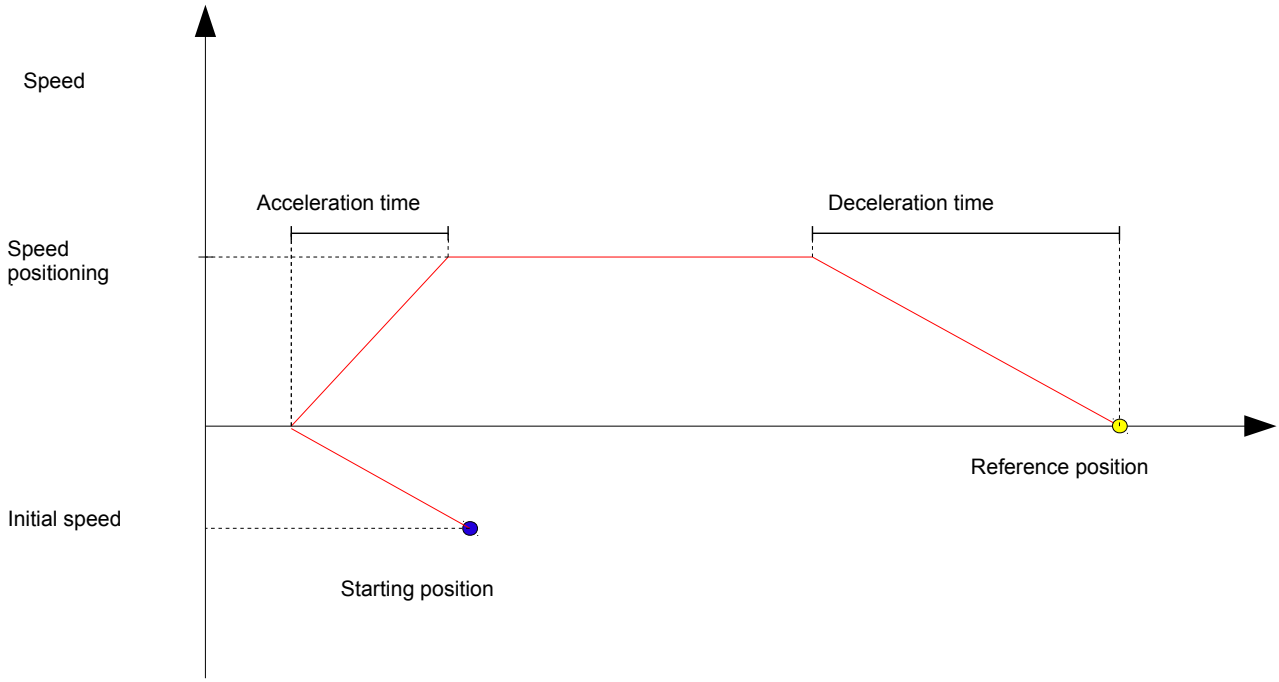
In general, movement from the starting position to the reference position takes place as follows:



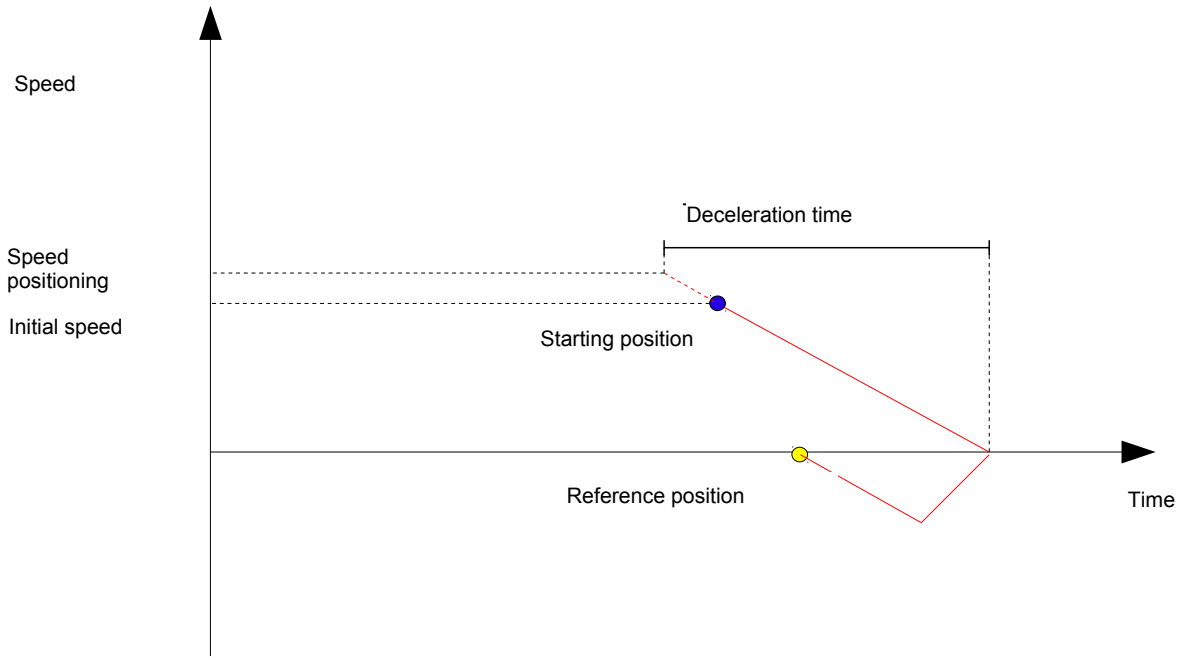
If there is insufficient space for reaching the positioning speed, a triangular type of profile is run:



If motion is in the direction opposite from the direction of requested movement, a profile of the following type is run:



If there is insufficient space for stopping motion at the desired position, a profile of the following type is run:



Position control is characterised by four parameters:

Reference position	This is the position to be reached at the end of movement (the final position depends on the Reference position and on the selected positioning method).
Positioning speed	This is the maximum speed applied during the requested movement
Acceleration time	*This value, expressed in milliseconds, is the time required to accelerate from zero to the positioning speed*
Deceleration time	This value, expressed in milliseconds, is the time required to decelerate from the positioning speed to a stop

4.4 HOMING

When it is turned on, the drive does not recognise the position of the mechanical component being moved. Before positioning can be accomplished, a procedure must be run that moves the mechanical component to a known position, which is acquired by the drive as a reference point for making the requested movements. This operation is performed by running a homing procedure.
A number of different types of homing procedures that involve different digital inputs can be run.

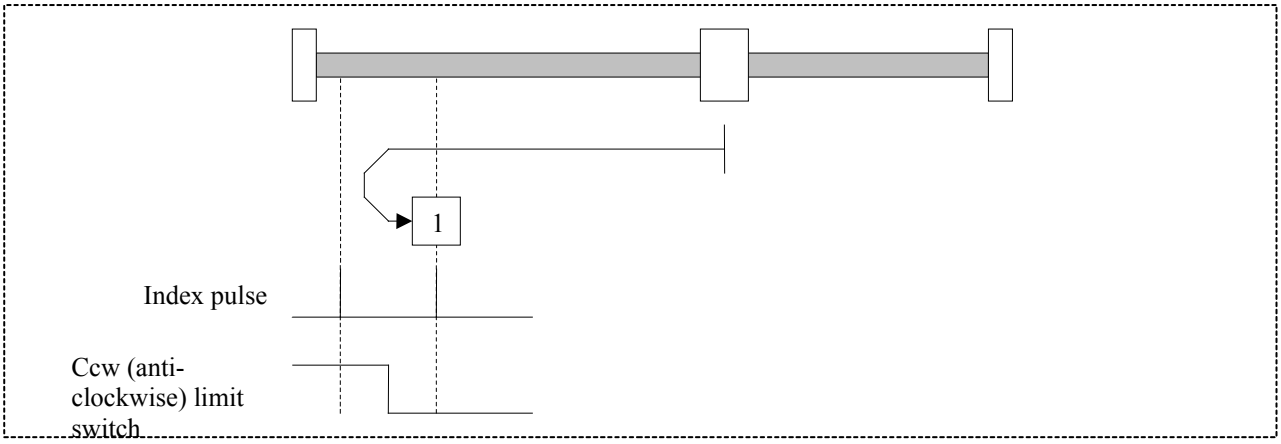
A homing procedure can be started only by executing a movement profile associated with the procedure. For further information on movement profiles, see the next section in this manual.

A homing procedure is characterised by the following parameters:

Homing procedure parameters	
Parameter	**Description**
Switch search speed	Parameter 35122, HOMING SW SPEED on menu 1.3.19 Sets the speed used when searching for the home switch or limit switch (depending on type of homing procedure used)
Resolver zero search speed	Parameter 35123, HOMING Z SPEED on menu 1.3.20 Sets the speed used when searching for the index pulse (resolver zero)
Homing acceleration/ Deceleration	Parameter 35124, HOMING RAMP TIME on menu 1.3.21 Sets the acceleration and deceleration applied during homing procedures. This is the time required for accelerating from 0 speed to the switch search speed, parameter 35122
Home Offset	Parameter 35125, HOME POS OFFSET on menu 1.3.22 This is the position value assigned to the current position at the end of the homing procedure
Type of homing	Parameter 35135, HOMING TYPE on menu 1.3.18 This parameter is used to set the type of homing procedure to be run

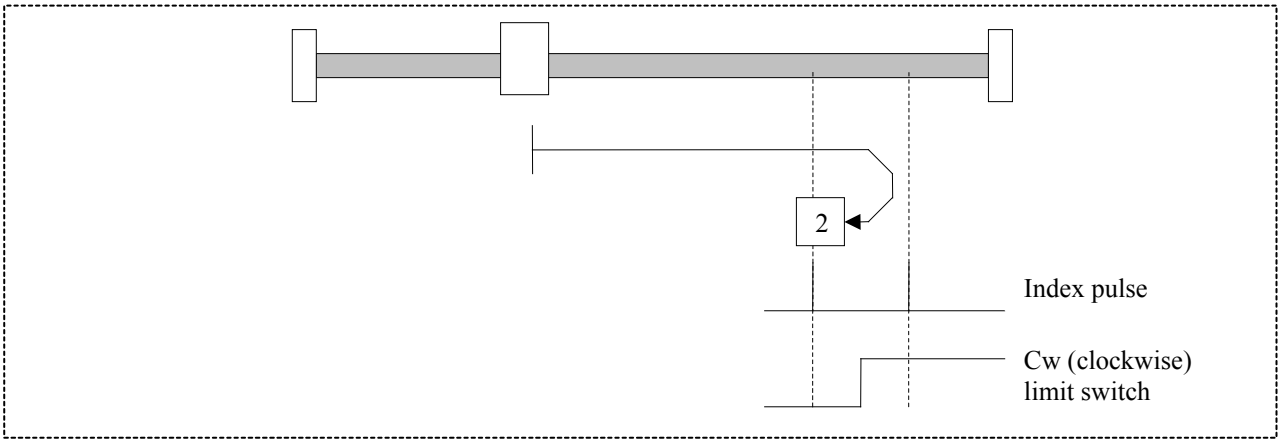
4.4.1 Types of homing

Type 1: Homing on anti-clockwise limit switch and index pulse (resolver zero).



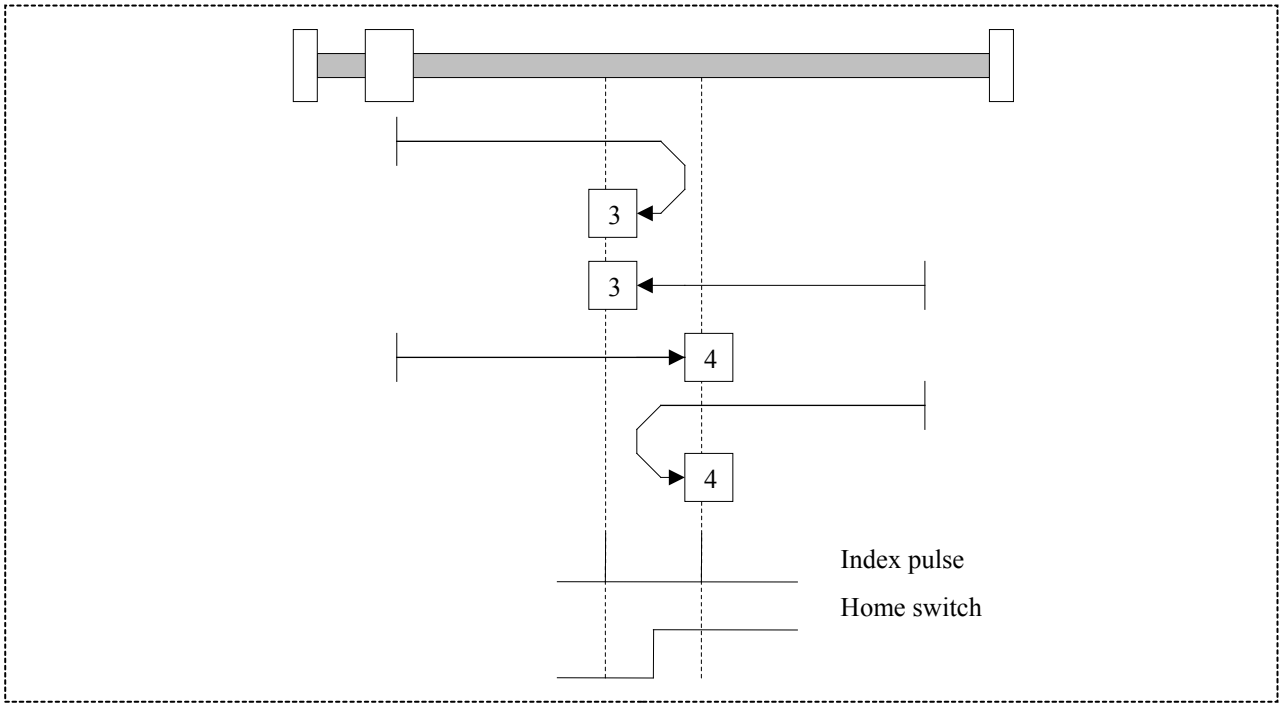
With this type of homing, the direction of initial movement is anti-clockwise toward the anti-clockwise limit switch, if it is inactive. The reference (home) position is on the first index pulse (resolver zero) to the right of the anti-clockwise limit switch, when the value on the latter switches to low.

Type 2: Homing on clockwise limit switch and index pulse (resolver zero).



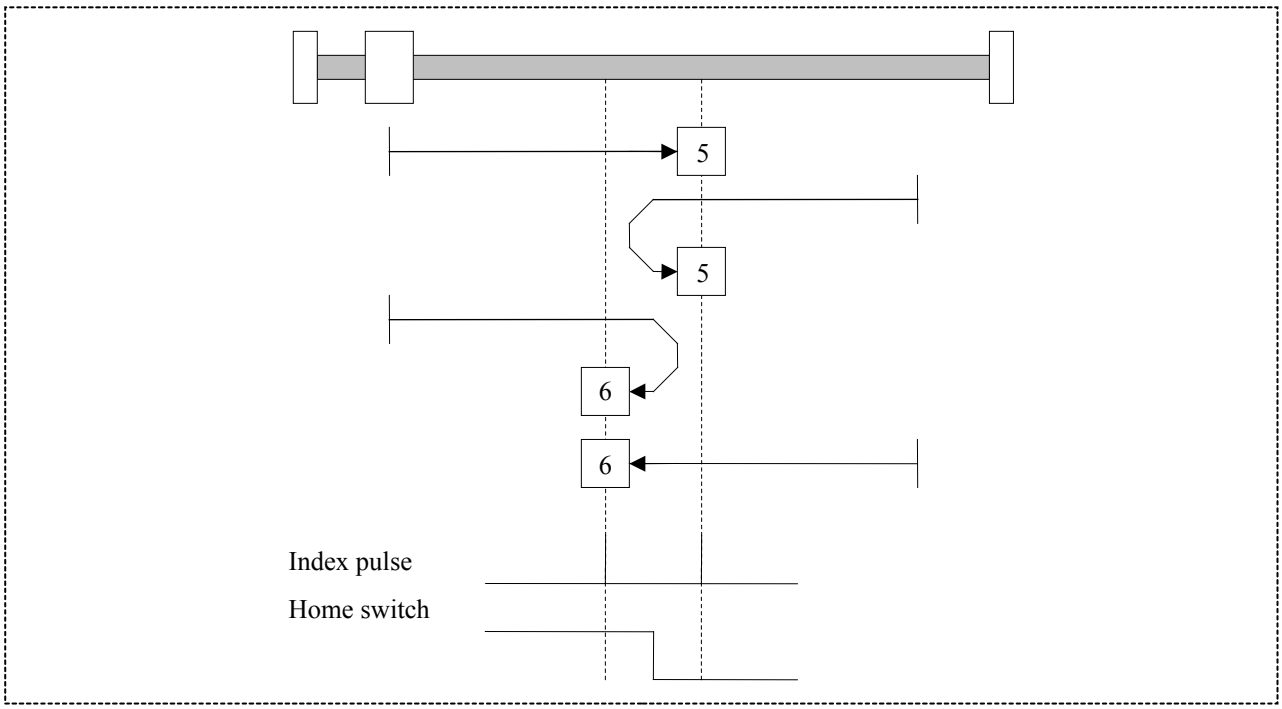
With this type of homing, the direction of initial movement is clockwise toward the clockwise limit switch, if it is inactive. The reference (home) position is on the first index pulse (resolver zero) to the left of the clockwise limit switch, when the value on the latter switches to low.

Types 3 and 4: Homing on positive home switch and index pulse (resolver zero).



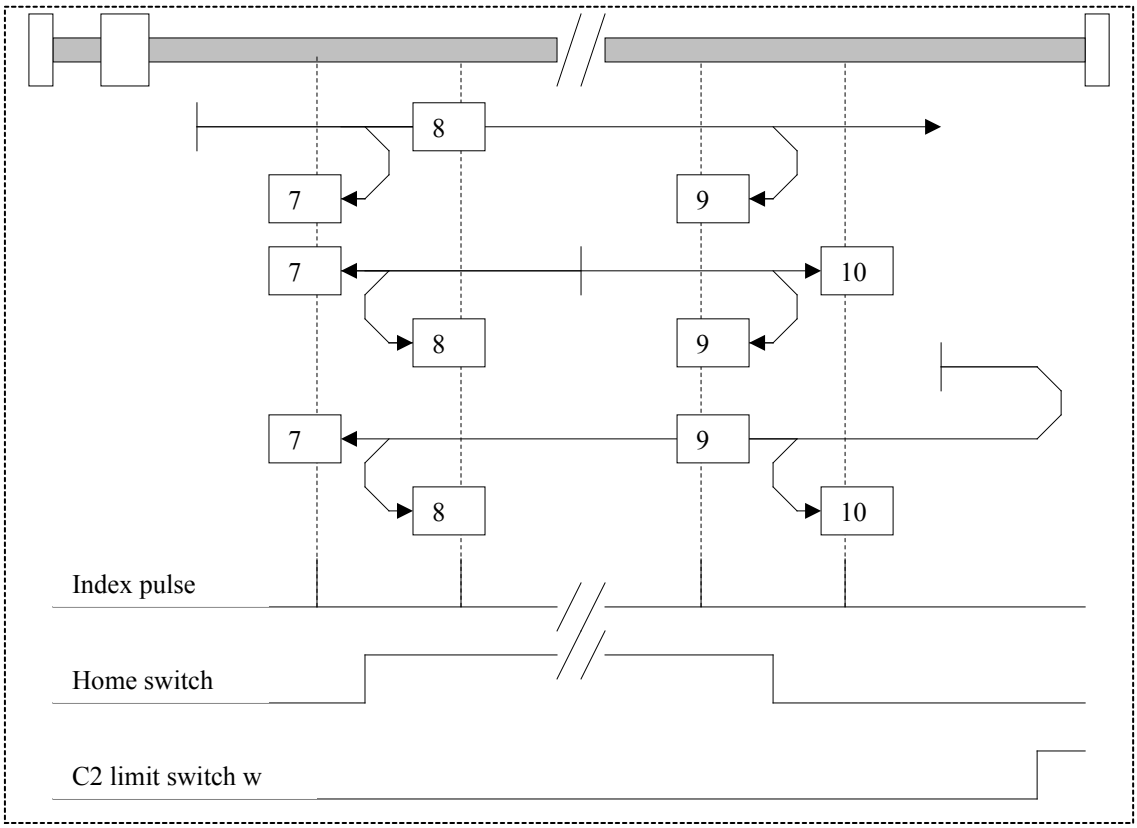
With types 3 and 4, the initial direction of movement depends on the state of the home switch. The reference (home) position is on the index pulse (resolver zero) to the left (type 4) or right (type 3) of the switching point of the home switch. If the starting position is such that a reversal of direction is required, the reversal takes place after the state of the home switch changes.

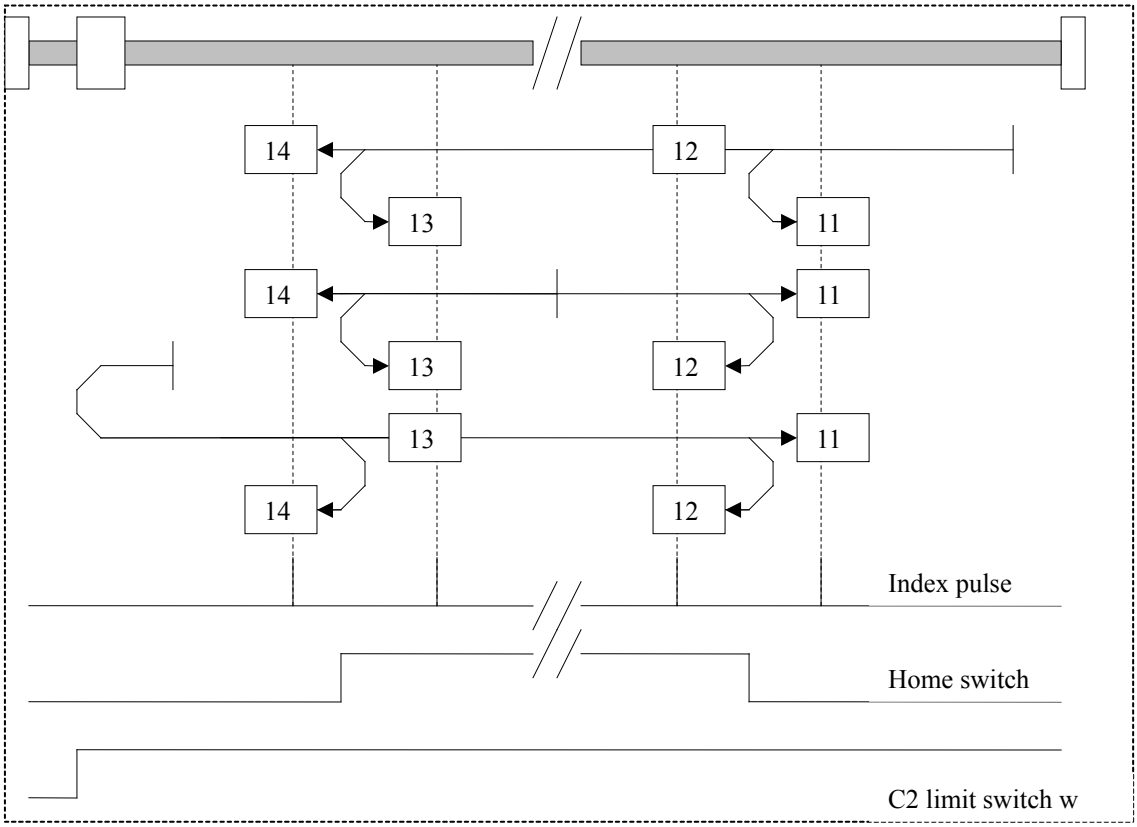
Types 5 and 6: Homing on negative home switch and index pulse (resolver zero).



With types 5 and 6, the initial direction of movement depends on the state of the home switch. The reference (home) position is on the index pulse (resolver zero) to the left (type 6) or right (type 5) of the switching point of the home switch. If the starting position is such that a reversal of direction is required, the reversal takes place after the state of the home switch changes.

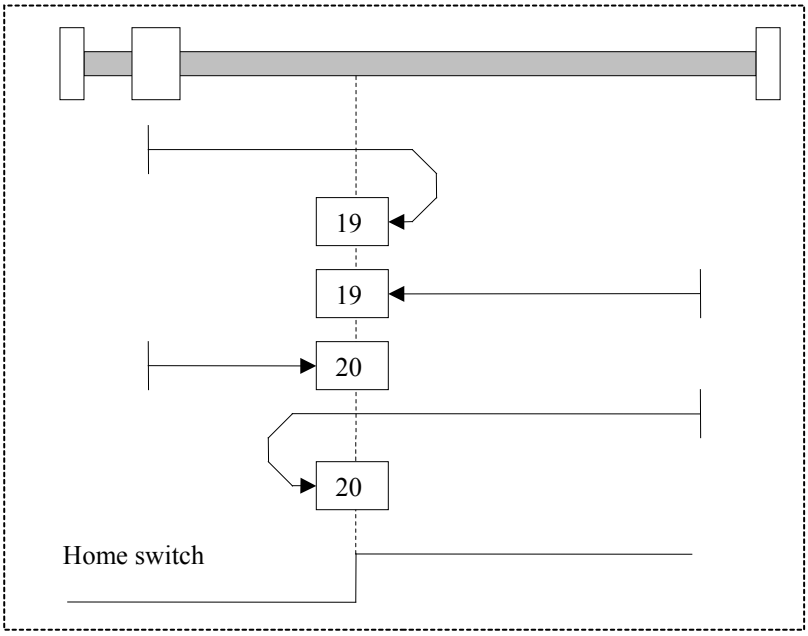
Types 7 to 14: Homing on home switch and index pulse (resolver zero).





These types of homing procedures use the home switch, which is at a high logic level only for a portion of the excursion. With types 7 through 10, the initial direction of movement is clockwise. With types 11 through 14, the initial direction of movement is anticlockwise (except if the home switch is at a high logic level when movement begins). In this case, the initial direction of movement depends on the desired change in state of the home switch. The reference (home) position is on the index pulse (resolver zero) to the left or right of the ascending or descending change in state of the home switch. If the initial direction does not meet the home switch, the direction is reversed toward the limit switch.

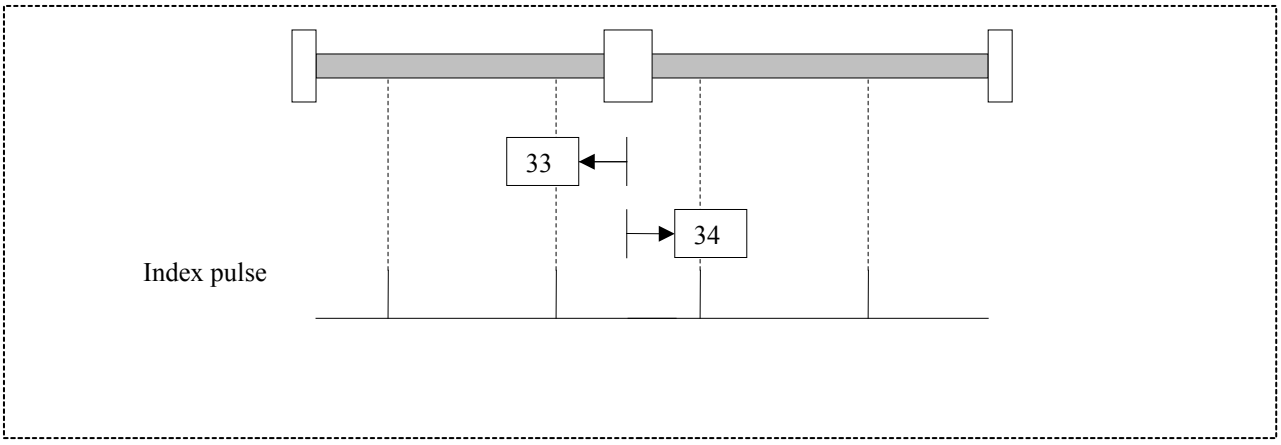
Types 17 through 30: Homing without index pulse (revolver zero).



Type with revolver zero	Corresponding type without revolver zero
1	17
2	18
3	19
4	20
5	21
6	22
7	23
8	24
9	25
10	26
11	27
12	28
13	29
14	30

These types of homing procedures are similar to types 1 through 14. The reference position does not depend on the index pulse (revolver zero) but only on the transition of the applicable home switch or limit switch.

Types 33 and 34: Homing on index pulse (revolver zero).



With the type 33 homing procedure, the initial direction is anti-clockwise; with type 34, it is clockwise. The reference (home) position is on the first index pulse (resolver zero) that is found in the selected direction.

Type 35: Homing at current position.

Types 15, 16, 31, 32: Reserved

4.5 Pulse-direction tracking

In this operating mode, the drive acquires the position reference from the digital inputs and converts it according to the conversion ratio expressed by P/D *Numerator* / *P/D Denominator.*

For example, if the motor must rotate once for every 523 input pulses, the numerator must be set to 128 and the denominator must be set to 1.00. The result is that 512 reference pulses/rotation * 128 (Numerator) / 1.00 (Denominator) = 65536 steps/rotation.

The tracking mode can be applied with control from the digital inputs, the modbus or movement profiles.

In the first two cases, the drive acquires the current position from an external reference. In this mode, the JOG and LIMIT priority inputs are disabled.

If tracking is applied with control from a movement profile, the position is acquired the moment the profile is run.

When position tracking based on pulse-direction is enabled, no acceleration or deceleration ramp is generated, nor is there any limitation on motor speed

Pulse-direction position tracking control is characterised by two parameters:

Numerator P/D	This is the numerator of the ratio between internal position resolution of 65536 steps/rotation and the number of control pulses associated with one motor rotation
Denominator P/D	This is the denominator of the ratio between internal position resolution of 65536 steps/rotation and the number of control pulses associated with one motor rotation

The direction input is sampled every millisecond, if movements are performed that involve a reversal of motion. To prevent the drive from committing errors, no pulses are generated for at least 1 ms after the state of the direction input changes. Otherwise, a position error may occur that is equal to double the pulses that reached the drive during said time interval, multiplied by the tracking factor.

5 PRIORITY INPUTS

Depending on the selected operating mode, digital inputs may be active that can modify the type of control applied to the motor.

The action of these inputs has priority over the type of control requested by the user.

Listed below are the priority inputs ordered from highest to lowest priority.

The action of a priority input zeros the start command from the keyboard and ends the execution of a movement profile.

5.1 JOG inputs

Two Jog inputs are provided: one for clockwise jog movement (JOG_CW) and one for anti-clockwise jog movement (JOG_CCW). Jog inputs are not active when torque control is applied. If activated, these inputs apply speed control with the following parameters:

Control applied to Jog inputs		
Parameters of speed control applied	**JOG_CW input**	**JOG_CCW input**
Speed reference	JOG speed, parameter 35109, JOG SPEED, menu 1.3.10	
Acceleration time	Jog acceleration time, parameter 35114, JOG RAMP TIME ,menu 1.3.12	
Acceleration speed	JOG speed, parameter 35109, JOG SPEED, menu 1.3.10	
Deceleration time	Quick deceleration time, parameter 35163, QUICK STOP TIME, menu 1.3.13	
Deceleration speed	Maximum speed, parameter 32926, SPEED MAX, menu 1.3.12	
Direction of rotation	Clockwise	Anti-clockwise

5.2 Limit switch inputs

The LIMIT SWITCH inputs are designed to control the final portion of mechanical travel. They are used to generate a quick stop ramp when they are activated and during homing procedures.

There are two limit switch inputs: LIMIT_SWITCH_CW and LIMIT_SWITCH_CCW.

A limit switch input is enabled if the direction of motor rotation is toward the respective limit switch. For example, if the direction of rotation is clockwise, the LIMIT_SWITCH_CW input is enabled. In this case, the tripping of LIMIT_SWITCH_CCW is ignored.

The behaviour of the two limit switches is identical. For simplicity, only the behaviour of LIMIT_SWITCH_CW is described.

If LIMIT_SWITCH_CW is tripped while the motor is rotating clockwise, all commands involving clockwise movement are inhibited as long as the input is disabled. Also, if the motor is rotating clockwise, speed control with the following parameters is applied:

Control applied by limit switch inputs		
Parameters of speed control applied	**Input LIMIT_SWITCH_CW**	**Input LIMIT_SWITCH_CCW**
Speed reference	0, no speed	
Acceleration time	Quick deceleration time, parameter 35163, QUICK STOP TIME, menu 1.3.13	
Acceleration speed	Maximum speed, parameter 32926, SPEED MAX, menu 1.3.12	
Deceleration time	Quick deceleration time, parameter 35163, QUICK STOP TIME, menu 1.3.13	
Deceleration speed	Maximum speed, parameter 32926, SPEED MAX, menu 1.3.12	
Direction of rotation	-	-

5.3 V_ENABLE input

The behaviour of the V_ENABLE input, which is always active, depends on the type of motor control that is active. If the active motor control is torque control: if V_ENABLE is at a low logic level, torque control is maintained with zero torque used as the reference. To be more specific:

Control applied without V_ENABLE, if torque control is active	
Parameters of torque control applied	
Torque reference	0, zero torque
Maximum speed	Unchanged
Direction of rotation	-

If the active motor control is different from torque control: if V_ENABLE is at a low logic level, speed control is applied with zero speed used as the reference. To be more specific:

Control applied without V_ENABLE, if motor control other than torque control is active	
Parameters of speed control applied	
Speed reference	0, no speed
Acceleration time	Acceleration time, parameter 35107, ACC TIME, menu 1.3.6
Acceleration speed	Maximum speed, parameter 32926, SPEED MAX, menu 1.3.12
Deceleration time	Deceleration time, parameter 35108, DEC TIME, menu 1.3.7
Deceleration speed	Maximum speed, parameter 32926, SPEED MAX, menu 1.3.12
Direction of rotation	-

6 PROFILES

The movement profile consists of a set of information that enables a certain type of control to be applied to motor movement.
The MINIACTION 300/500 servo drive can store 128 movement profiles, each of which can be loaded and executed by selecting its number over the modbus control register or over the digital inputs.

There is an additional profile (the modbus profile) which is volatile and not saved when the drive is shut off. This profile has two functions:

- It is used as a reading/writing buffer when reading and writing one of the 128 profiles. See the section describing modbus registries for further information
- It can be executed directly using the modbus command

To start a movement profile from digital inputs, proceed as follows:

- set the active controller (parameter 35166, CONTROLLER , menu 1.3.3) to 2, DIG I/O
- Set the type of motor control (parameter 35165, MOTOR CONTROL , menu 1.3.2) to 2, PROFILE
- enable the drive
- select the movement profile using digital inputs T1_IN, T2_IN.... , T7_IN
- begin executing the profile by raising the STROBE digital input

To start a movement profile from the modbus, proceed as follows:

- set the active controller (parameter 35166, CONTROLLER, menu 1.3.3) to 0, MODBUS
- Set the type of motor control (MODBUS registry address 20, MODE field) to 2, PROFILE
- If the modbus profile is being run, set it to the desired values using registry addresses 26 through 33
- enable the drive
- select and start the profile to be run by setting profile control registry address 25

Each movement profile consists of 7 fields, as follows:

MOVEMENT PROFILE					
Parameters	**Description**				
Type of profile	HOMING	SPEED	ALL POSITION PROFILES	TRACKING PULSES DIRECTION	TORQUE
Acceleration/torque in profile	Unknown	Acceleration time	Acceleration time	Unknown	Torque reference (current) and direction
Speed in profile	Unknown	Reference speed and direction	Speed of travel	Unknown	Maximum speed
Deceleration in profile	Unknown	Deceleration time	Deceleration time	Unknown	Unknown
Position in profile	Unknown	Unknown	Position reference in accordance with type of positioning	Unknown	Unknown
Numerator of tracking ratio in profile	Unknown	Unknown	Unknown	Numerator of tracking ratio	Unknown
Denominator of tracking ratio in profile	Unknown	Unknown	Unknown	Denominator of tracking ratio	Unknown

The following are details of motor control applied according to type of profile:

6.1 HOMING

The drive starts the homing procedure, which is characterised by the parameters described in the HOMING section in this manual.

If the movement profile is a homing profile, the homing procedure is started when the profile is run.

No other parameter must be specified in the movement profile.

6.2 SPEED

If a SPEED movement profile is used, Speed control with the following parameters is applied:

Control applied by a SPEED type of movement profile	
Parameters of speed control applied	**Assigned value**
Speed reference	*Speed in profile*
Acceleration time	*Acceleration/torque in profile*
Acceleration speed	*Speed in profile*
Deceleration time	*Deceleration in profile*
Deceleration speed	*Speed in profile*
Direction of rotation	If *speed in profile* > 0 clockwise If *speed in profile* < 0 anti-clockwise

6.3 ABS POS

If a ABS POS movement profile is used, Position control with an absolute reference position (see also POSITION MANAGEMENT) is applied with the following parameters:

Control applied by a ABS POS type of movement profile	
Parameters of position control applied	**Assigned value**
Reference position	The position specified in the profile is used as the absolute reference position.
Positioning speed	*Speed in profile*
Acceleration time	*Acceleration/torque in profile*
Deceleration time	*Deceleration in profile*

6.4 REL POS

If a REL POS movement profile is used, Position control with a relative reference position (see also POSITION MANAGEMENT) is applied with the following parameters:

Control applied by a REL POS type of movement profile	
Parameters of position control applied	**Assigned value**
Reference position	The previous reference position to which the amount of travel specified in the position profile is added is used as the absolute reference position.
Positioning speed	*Speed in profile*
Acceleration time	*Acceleration/torque in profile*
Deceleration time	*Deceleration in profile*

6.5 TORQUE

If a TORQUE movement profile is used, Torque control with the following parameters is applied:

Control applied by a TORQUE type of movement profile	
Parameters of torque control applied	**Assigned value**
Torque reference	*Acceleration/torque in profile*
Maximum speed	Speed in profile
Direction of rotation	If *acceleration/torque in profile* > 0 clockwise If *acceleration/torque in profile* < 0 anti-clockwise

6.6 SHORT RUN

If a SHORT RUN movement profile is used, Position control with an absolute reference position (see also POSITION MANAGEMENT) is applied with the following parameters:

Control applied by a SHORT RUN type of movement profile	
Parameters of position control applied	**Assigned value**
Reference position	The position specified in the profile is used as the absolute reference position. Travel is in the direction of the shorter path within the machine cycle.
Positioning speed	*Speed in profile*
Acceleration time	*Acceleration/torque in profile*
Deceleration time	*Deceleration in profile*

6.7 CW POS

If a CW POS movement profile is used, Position control with an absolute reference position (see also POSITION MANAGEMENT) is applied with the following parameters:

Control applied by a CW POS type of movement profile	
Parameters of position control applied	**Assigned value**
Reference position	The position specified in the profile is used as the absolute reference position. Travel is always in the positive direction.
Positioning speed	*Speed in profile*
Acceleration time	*Acceleration/torque in profile*
Deceleration time	*Deceleration in profile*

6.8 CCW POS

If a CCW POS movement profile is used, Position control with an absolute reference position (see also POSITION MANAGEMENT) is applied with the following parameters:

Control applied by a CCW POS type of movement profile	
Parameters of position control applied	**Assigned value**
Reference position	The position specified in the profile is used as the absolute reference position. Travel is always in the negative direction.
Positioning speed	*Speed in profile*
Acceleration time	*Acceleration/torque in profile*
Deceleration time	*Deceleration in profile*

6.9 PULS DIR

If a PULS DIR movement profile is used, Position control with an absolute reference position (see also POSITION MANAGEMENT) is applied with the following parameters:

Control applied by a PULS DIR type of movement profile	
Parameters of position control applied	**Assigned value**
Numerator P/D	*Numerator of tracking ratio in profile*
Denominator P/D	*Denominator of tracking ratio in profile*

7 PLACEMENT INTO SERVICE

Preliminary checks:

- The drive must be connected to 24 VDC power
- The drive must be connected to 230 VAC single-phase power
- The drive must be configured in conformance with the connected motor and parameters must be set according to the application using the keyboard, MiniMe configuration software or the modbus.

The operations to be carried out before first start-up are associated with the type of motor connected and are different for synchronous and asynchronous motors.

7.1 Synchronous motors

In general, to control this type of motor, the servo drive must recognise the angular position of the rotor in order to calculate the orientation of the magnetic field generated by the permanent magnets on the rotor and the gain in the current control loop so it can control the current.
The angular position is obtained by a position transducer that must be present on the motor. The MINIACTION 300/500 can handle position sensors for both a resolver and an encoder.
The gain in the current control loop depends on the type of motor and is preset for each motor on the motor list. A given gain can generally be applied only to the motor with which it is associated.

7.1.1 Position sensor calibration

The MINIACTION 300/500 can calibrate the position sensors and their phase shift with respect to the rotor using an automatic calibration procedure.
This procedure can be run from menu 1.8.7 or using modbus register 35128. The relative details are specified in the COMMAND PROCEDURES section in this manual.
The procedure can run correctly only after the following conditions are met:

- The drive must be disabled.
- A position sensor must be connected and the relative parameters must be entered.
- Motor parameters, nominal current, proportional current gain and supplementary gain must be correctly entered.

If the connected motor includes a holding brake, the latter must be managed with the following settings:

- Enabling of control output for the holding brake, parameter 32966 = 1
- Configuration of the logic level of the control output for the holding brake, parameter 32971 = 0
- Release of brake, with enabling of drive, parameter 32967 = 2
- Zeroing of delay in the release of the holding brake, parameter 32968 = 0

The position feedback calibration procedure is run by generating a current ramp that increases until the current reaches the nominal current of the motor. When this occurs, the motor is rotated slowly for slightly more than 2 mechanical turns to detect the number of pairs of poles on the motor, the direction of rotation resulting from the wiring of its phases and the order in the sequence transmitted by the Hall-effect sensors if position feedback is obtained using the encoder.
The procedure for detecting the above parameters uses the position value provided by the position sensor as the only reference, which means that if the procedure is to be successful, no error is allowed in connection of the SIN and COS signals (if a resolver is used) or in signals A and B (if the encoder is used).
If the wiring is inverted, which would result in reversing the direction of rotation seen by the drive, the problem can be resolved without rewiring the position sensor by changing the programmed direction using parameter 32904, FEEDBACK DIR , menu 1.8.2. Then, repeat the calibration procedure.

If calibration is successfully concluded, parameter 32965, CALIBRATION , menu 1.8.8 will change from NOT DONE to DONE .

All parameters obtained during calibration, and the parameter of the calibration carried out as just described, can be programmed directly by the user if they are known.

Note:
All parameters are saved at the end of the calibration procedure,
including the parameters for the calibration that has been completed. Any temporary changes made to other parameters are saved in non-volatile memory.

7.2 Asynchronous motors

Asynchronous motors can be controlled with or without position feedback (from the encoder or resolver). Type V/f control without feedback uses an open ring, and the drive generates a voltage that depends on the voltage required/set by the user.
When feedback is used, torque and speed can be controlled. For these controls to be correctly applied, the user must check that the direction of rotation is correct, after connecting the motor and the position feedback to the drive.
This check can be made as follows:

- Set the position feedback, parameter 32905, FEEDBACK TIPE, menu 1.8.1
  to 0: NONE No transducer installed.
- Start motor rotation with a positive speed reference. See the OPERATIONG METHODS section below for a list of the ways to start the motor.

- Check that direction of rotation is the one desired by the user.
- Set the position feedback, parameter 32905, FEEDBACK TIPE, menu 1.8.1 to suit the transducer installed.
- Manually rotate the motor and check the direction of rotation read through position feedback by the MiniMe software (measurements section, motor speed) or using the keyboard from the main menu, after the default display value is set by changing parameter 35195, DISPLAY VALUE, menu 1.11.1 to 5: SPEED (the standard menu displays the current speed). The direction of rotation that increases the position is considered to be positive by the drive.

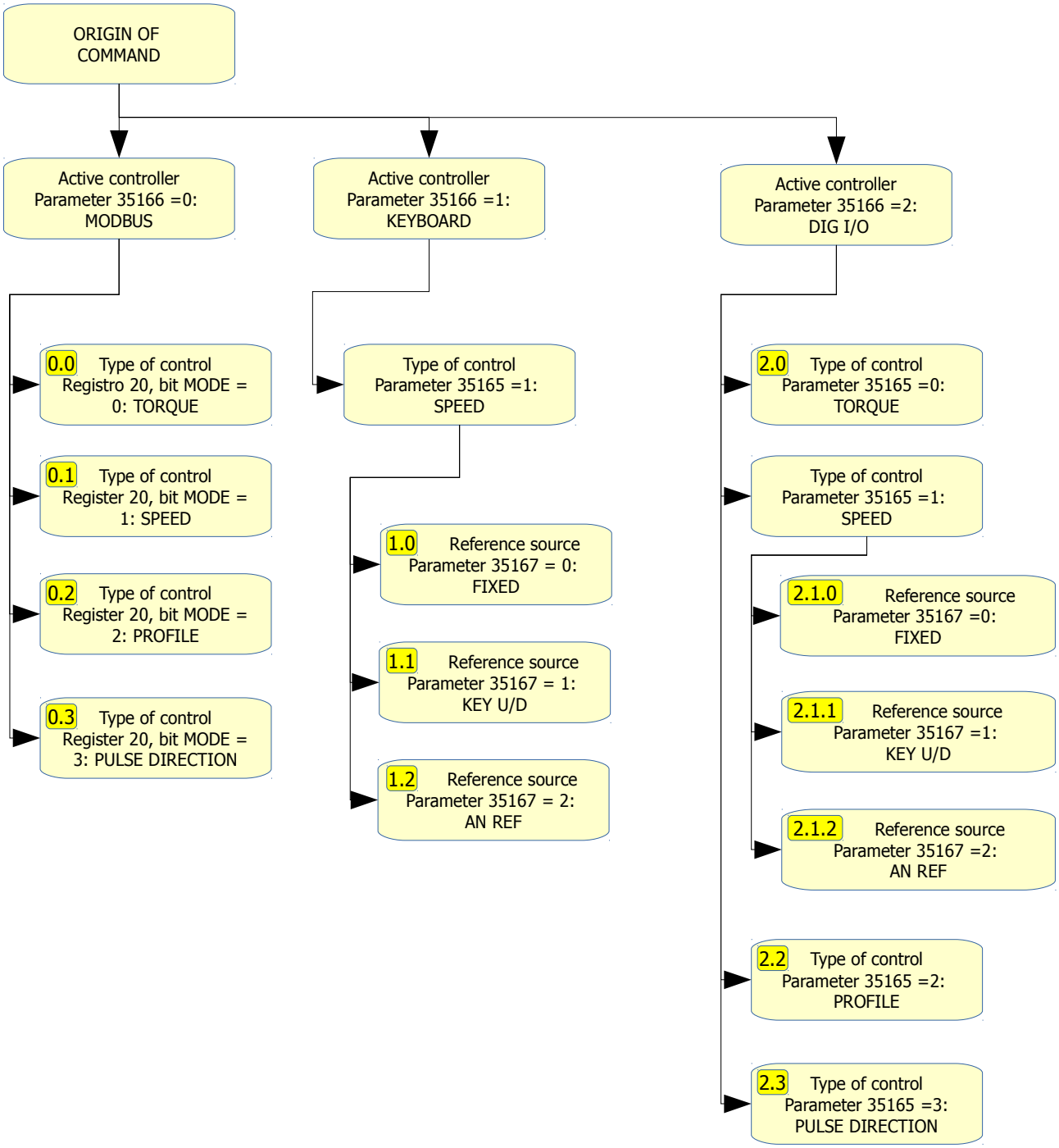
After these operations have been performed, the user must make sure the direction of rotation is consistent with position feedback by changing the following parameters:

- Parameter 32904, FEEDBACK DIR, menu 1.8.2, this parameter sets the direction of position feedback. Changing this parameter inverts the direction set by wiring the position feedback.
- Parameter 32955, MOT CABLE DIR, menu 1.8.3, this parameter sets the direction of motor rotation set by wiring the phases. Changing this parameter is equivalent to inverting the 2 motor phases and reverses the direction of motor rotation.

Finally, the user can change the following parameter:

- Parameter 32961, MOT DIRECTION , menu 1.3.9, this parameter sets the direction of motor rotation. Changing this parameter is equivalent to inverting the rotation reference-command signal.

8 OPERATING METHODS



8.1 Modbus controller, torque control - 0.0

In these configurations, the servo drive applies torque control with the following parameters:

Modbus controller, torque control	
Parameters of torque control applied	**Assigned value**
Torque reference	Contents of modbus register 21
Maximum speed	Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Direction of rotation	If the DIR MOTOR bit in register 20 = 0: If the contents of modbus register 21 > 0 clockwise If the contents of modbus register 21 < 0 anti-clockwise If the DIR MOTOR bit in register 20 = 1: If the contents of modbus register 21 > 0 anti-clockwise If the contents of modbus register 21 < 0 clockwise

8.2 Modbus controller, speed control - 0.0

In this configuration, the drive applies speed control with the following parameters:

Modbus controller, speed control	
Parameters of speed control applied	**Assigned value**
Speed reference	Contents of modbus register 21
Acceleration time	Modbus parameter and register 35107, ACC TIME, menu 1.3.6.
Acceleration speed	Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Deceleration time	Modbus parameter and register 35108, DEC TIME, menu 1.3.7.
Deceleration speed	Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Direction of rotation	If the DIR MOTOR bit in register 20 = 0: If the contents of modbus register 21 > 0 clockwise If the contents of modbus register 21 < 0 anti-clockwise If the DIR MOTOR bit in register 20 = 1: If the contents of modbus register 21 > 0 anti-clockwise If the contents of modbus register 21 < 0 clockwise

8.3 Modbus controller, profile management - 0.2

In this configuration, the servo drive runs the selected profile. Profiles are managed by setting the contents of modbus registers 21 and 26 through 33 (inclusive).

If the EXEC bit in modbus register 21 is high, the servo drive will run the selected profile.

If the MB_PROF bit in modbus register 21 is high, the selected profile is a volatile modbus profile consisting of the contents of modbus registers 26 through 33 (inclusive).

If the MB_PROF bit in modbus register 21 is low, the profile that will be run is the one specified by the binary value of the PROFILE_NUMBER bits in modbus registers 21.

The profile will keep running until 0 is written in the EXEC bit in modbus registers 21 or until a priority input is imposed.

For types of profiles and a description of the priority inputs, see the specific paragraphs above.

8.4 Modbus controller, direction pulse tracking – 0.3

In this configuration, the drive performs position control by tracking the external position reference obtained from the pulse and direction inputs. Tracking control is characterised by the following parameters:

Modbus controller, pulse-direction tracking	
Parameters of pulse-direction control applied	**Assigned value**
Numerator P/D	Modbus parameter and register 35119, P/D NUM RATIO, menu 1.3.41.
Denominator P/D	Modbus parameter and register 35120, P/D DEN RATIO, menu 1.3.42.

8.5 Keyboard controller, speed control, fixed reference - 1.0

8.6 Keyboard controller, speed control, reference variable from keyboard - 1.1

8.7 Keyboard controller, speed control, reference obtained from analogue input - 1.2

In these configurations, the servo drive applies speed control with the following parameters:

Keyboard controller, speed control		
Parameters of speed control applied		**Assigned value**
Speed reference	1.0	Modbus parameter and register 35157, SPEED REF, menu 1.3.5. Cannot be modified from keyboard.
	1.1	Modbus parameter and register 35157, SPEED REF, menu 1.3.5. Can be modified from keyboard.
	1.2	Analogue reference obtained from active analogue input.
Acceleration time		Modbus parameter and register 35107, ACC TIME, menu 1.3.6.

Acceleration speed	Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Deceleration time	Modbus parameter and register 35108, DEC TIME, menu 1.3.7.
Deceleration speed	Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Direction of rotation	If the command sent by the keyboard is 4: If the *Speed reference* > 0 clockwise If the *Speed reference* < *0 anti-clockwise* If the command sent by the keyboard is 3: If the *Speed reference* > 0 anti-clockwise If the *Speed reference* < 0 clockwise

8.8 Digital input controller, torque control - 2.0

In these configurations, the servo drive applies torque control with the following parameters:

Digital input controller, torque control	
Parameters of torque control applied	**Assigned value**
Torque reference	Reference from analogue input
Maximum speed	Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Direction of rotation	If digital input DIR_IN is low, torque is applied clockwise If digital input DIR_IN is high, torque is applied anti-clockwise

8.9 Digital input controller, speed control, fixed reference - 2.1.0

8.10 Digital input controller, speed control, variable reference from keyboard - 2.1.1

8.11 Digital input controller, speed control, reference from analogue input - 2.1.2

In these configurations, the servo drive applies speed control with the following parameters:

Digital input controller, speed control		
Parameters of speed control applied		**Assigned value**
Speed reference	2.1.0	Modbus parameter and register 35157, SPEED REF, menu 1.3.5. Cannot be modified from keyboard.
	2.1.1	Modbus parameter and register 35157, SPEED REF, menu 1.3.5. Can be modified from keyboard.
	2.1.2	Analogue reference obtained from active analogue input.
Acceleration time		Modbus parameter and register 35107, ACC TIME, menu 1.3.6.
Acceleration speed		Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Deceleration time		Modbus parameter and register 35108, DEC TIME, menu 1.3.7.
Deceleration speed		Modbus parameter and register 35111, SPEED MAX, menu 1.3.11.
Direction of rotation		If digital input DIR_IN is at a low logic level: If the *Speed reference* > 0 clockwise If the *Speed reference* < *0 anti-clockwise* If digital input DIR_IN is at a high logic level: If the *Speed reference* > 0 anti-clockwise If the *Speed reference* < 0 clockwise

8.12 Digital input controller, profile management - 2.2

In this configuration, the servo drive runs the selected profile. The profile is managed through digital inputs T1_IN through T7_IN.

For example, to select movement profile 94: 94 in binary is 1011110.
To select profile 94: enable inputs T2_IN, T3_IN, T4_IN, T5_IN, T7_IN and disable inputs T1_IN and T6_IN.

After the profile is selected, it is run by raising the STROBE input signal.
The profile will keep running until a priority input is imposed or a different profile is executed.

For types of profiles and a description of the priority inputs, see the specific paragraphs above.

8.13 Modbus controller, direction pulse tracking – 2.3

In this configuration, the drive performs position control by tracking the external position reference obtained from the pulse and direction inputs. Tracking control is characterised by the following parameters:

Digital input controller, pulse-direction tracking	
Parameters of pulse-direction control applied	**Assigned value**
Numerator P/D	Modbus parameter and register 35119, P/D NUM RATIO, menu 1.3.41.
Denominator P/D	Modbus parameter and register 35120, P/D DEN RATIO, menu 1.3.42.

8.14 Enabling

The drive can be enabled only if DC Bus voltage is correct. This voltage must not exceed 400 V and must exceed 260 V.

The drive will be disabled with error 10, C1D_MAX_VBARRA, if DC Bus voltage exceeds 400 V.

The drive will be disabled with error 14, C1D_MIN_VBARRA, if DC Bus voltage is less than 190 V.

The T-Enable input must be activated in order to enable the drive.

The V-Enable input must be activated in order to enable motor movement.

If the active controller is the modbus bus, enabling depends on the value of bits V_ENABLE and T_ENABLE in the modbus register with address of 00020, 0x0014. In this case, there are 2 possible options:

- The drive will be enabled if the physical T-Enable input and bit T_ENABLE are both active. Movement will be enabled if the physical V-Enable input and bit V_ENABLE are both active. Here is the default option selected with the following parameter on menu 1.10.5, MB NO LOC ENABLE = NO
- Enabling of the servo drive is controlled exclusively by the value of bit T_ENABLE. Enabling of movement is controlled exclusively by the value of bit V_ENABLE. This option is selected with the following parameter on menu 1.10.5, MB NO LOC ENABLE = YES

9 INTERACTION THROUGH TTR001

MINIACTION 300/500 servo drives are set up to accept a TTR001 removable operator interface, which is used for parameterisation and for reading possible error codes. The interface consists of an 8-character, 2-line alphanumeric display and 4 arrow keys. A special seat is provided at the front of the servo drive for snapping in the interface and its HMI port.

Functions of keyboard

The following table shows the functions of the keys:

◀ ⏪	**Navigation**: Pressing the left arrow key returns the system to the menu on the next higher level. If you are in the main menu, the screen showing the status of the device is displayed. From this screen, you can press the left arrow key to display the firmware version and the model of servo drive. **To modify data:** This key moves the cursor to the digit immediately to the left of the digit currently indicated by the cursor. If the cursor is positioned over the digit on the extreme left, the cursor will not move. A change in progress (that is, a change which has not yet been confirmed) can be cancelled by holding down this key for 1 second. (key press will subsequently be indicated by the symbol 7)
▶ ⏩	**Navigation:** Pressing the right arrow key moves the system to the menu on the next lower level. The active entry is found on the first line on the LCD and is indicated by the flashing character "`>`" to the left of the wording. **To modify data:** Holding down this key (key press will subsequently be indicated by the symbol 8) for at least 1 second causes the system to enter the modification mode for the selected parameter, if it can be modified under current conditions and if you are at a level of access that allows the parameter to be modified. When the cursor appears under the character on farthest right in the field, the system is in the modification mode. Press this key to move the cursor to the digit immediately to the right of the currently indicated digit. If the cursor is positioned over the digit on the extreme right, the cursor will not move. To confirm a change, hold down this key for at least one second.
▲	**Navigation:** Pressing the up arrow key moves the system to the previous item on the current menu. If the system is already positioned on the first item on the menu, pressing the key will have no effect. **To modify data:** This key increases the digit where the cursor is positioned. If the digit reaches the maximum value allowed, the system will try to increase the digit on the immediate left (unless it is also at its maximum value).
▼	**Navigation:** Pressing the down arrow key moves the system to the next item on the current menu. The end of the list of items on the menu is indicated by a line consisting of minus signs: `--------`.

	To modify data: This key decreases the digit where the cursor is positioned. If the digit reaches the minimum value allowed, the system will try to decrease the digit on the immediate left (unless it is also at its minimum value).

9.1 Modifying a parameter

Parameter modification and/or making a choice in general occurs in the following sequence:

- Pressing key the 8 from the current submenu gains access to the modification entering mode for the selected item
- The possibility of modifying a parameter is indicated by the cursor
- If it is not displayed, modification is not allowed. This may occur if you do not have the level of access required by the current menu item or because one of the required conditions has not been met
- The arrow keys are used to modify the item, and once the value has been set or the desired choice has been made, the change can be confirmed by pressing the key 8 or cancelled by holding down the key 7. The entering mode disables text scrolling on the display.

9.2 Types of items

9.2.1 Display

These items are used to display a measurement and/or parameter. No change or additional navigation is possible. An example of this type of item is measurements on the measurements menu.
This type of item is indicated on the menu description table by the symbol RO in the type column.

9.2.2 Control

These items are used to modify a value and/or control a procedure. To access the associated function, press the key 8.
This type of item is indicated on the menu description table by the symbol 8 or the symbol P8 in the type column.

9.2.3 Navigation

These items are used to move around the hierarchy of the menu with the arrow keys.
This type of item is indicated on the menu description table by the symbol ► in the type column.

9.3 Display during start-up

This is displayed at start-up

to show that the system is starting up. The stylised asterisks are animated to show that start-up operations are in progress.

Note: After the firmware is updated, start-up may take more time to allow the device to be updated.

9.4 Display if an error occurs

If an error occurs, the following message will appear regardless of what is being displayed:

Where xx is the number of the error that has occurred.

The error is displayed for 2 seconds.

When this time elapses, navigation is restored to the previous position that the system was in before the error occurred.

9.5 Start-up display

The start-up screen displayed depends on the configuration of the device. The drive can display a control menu that allows the user to impart start commands and change the speed reference under certain operating conditions.

If the selected operating mode allows the use of this menu, the **command menu** is displayed at start-up.

In all other cases, the **standard menu** is shown at start-up.

To switch from the command menu to the standard menu, press the key 8.

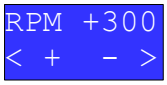
To switch to the command menu from any position on the standard menu, press the key 7.

9.6 Command menu

The command menu is enabled if the operator decides to control the drive from the keyboard.

The command menu can take different forms that depend on the selected operating mode.

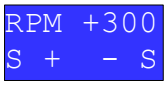
In its complete configuration, it looks like this:



If this menu is displayed, the user can change the speed reference using the ▲key to increase it and the ▼ key to decrease it.

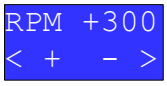
If the servo drive is enabled and the motor is not operating, pressing the ► key starts the motor in the clockwise direction at the displayed speed. Pressing the ◄ key, on the other hand, tarts the motor in the anti-clockwise direction.

If the motor is turning, the following will be displayed:



In this case, pressing either the ► key or the ◄ key stops the motor.

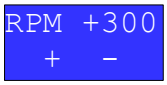
If a priority input (Jog operation command, tripping of a limit switch, absence of enabling signal) is triggered while the motor is turning, the drive executes the command with the higher priority and cancels the command from the keyboard. The following menu is displayed once again:



If the speed reference is fixed, it cannot be modified from the keyboard, and the control menu will look like this:

In this case, the reference displayed is the value set with 35111, SPEED MAX , menu 1.3.11.
The same screen is used if the start and stop commands are given on the keyboard and the reference speed is obtained from the analogue input.
In this latter specific case, the speed reference value is the one associated with the analogue value of reference.

There is one case in which movement is not controlled from the keyboard and the command menu is enabled in the following form:



This configuration occurs if motor movement is controlled from the digital inputs and the speed reference can be changed using the ▲ and ▼ keys.
To set the operating mode, see the section on operating modes.

9.7 Standard menu

The **standard menu** is shown after the device starts up if the selected operating mode does not involve the use of the **command menu**. The standard menu consists of a **main menu** and several sub-menus.
Both initial access and navigation of the standard menu start from the main menu, which is subdivided hierarchically into various sub-menus.
To manage the parameters, a classification into levels of access is provided which enables a level of protection to be associated with each piece of data. To move from one level to the next, a password must be entered using the function provided.

If no key on the keyboard is pressed for 3 minutes, the system returns to the main menu, and the level of access to the various items on the menu, which is set with the entry of the access password, is zeroed.

Main menu

If an error condition exists on the drive, the main menu displays the relative error number as follows

Where xx is the error number.

If an error condition exists on the drive, the information shown on the main menu can be selected by the user from the following options:

1) STATUS
2) SPEED
3) I MOT
4) V MOT
5) INT TEMP
6) POSITION
7) PROFILE

The following are detailed descriptions of the displayed information for each possible selection.

1) STATUS

The upper line on the display can assume one of the values listed on the following ***Servo Drive Status Table:***

NO POWER	The main power feed to the device is shut off
DISABLED	The servo drive is disabled: the main power is on, and the device is ready for the enabling command
ENABLED	The servo drive is enabled

The lower line

TORQUE	The device is applying torque control
VELOCITY	The device is applying speed control
POSITION	The device is applying position control
NONE	The device is applying torque control with no torque reference

2) SPEED

The following wording scrolls along the upper line of the display: MOTOR SPEED

The second line shows motor speed in RPM.

3) I MOT

The following wording scrolls along the upper line of the display: MOTOR CURRENT

The second line shows the current delivered to the motor in amps RMS.

4) V MOT

The following wording scrolls along the upper line of the display: MOTOR VOLTAGE

The second line shows the voltage delivered to the motor in volts RMS.

5) INT TEMP

The following wording scrolls along the upper line of the display: DRIVE TEMP

The second line shows the internal temperature of the power module.

6) POSITION

This setting is used to display the current position.

At start-up, the current position is considered to be position 0 by the drive.

For the drive to display a valid position, a homing procedure must first be performed. If it has not been performed, the following expressions are flashed in alternating fashion on the first line of the keyboard: HOMING followed by NOT DONE.

After the homing procedure has been executed, the display shows the word POSITION on the first line.

In both cases, the second line shows the value of the current position. If the current position is too large to be shown on the 8-character display, it is scrolled.

7) PROFILE

The following is shown on the upper line of the display: PROFILE

If no profile is being run, the following is shown on the second line: NUM: –

If a profile is active, and the active profile is the modbus profile, the following is displayed: MB PROF

If the active profile is not the modbus profile but is one of the 128 programmable profiles, the profile number is displayed as follows: NUM: xxx

9.8 Status message

If the ◄ navigation button on the main menu is pressed, the following screen appears for 2 seconds

which shows the model of device on the first line and the firmware version on the second.

9.9 Level of access

If the LEVEL item on the first sub-menu is selected an the key 8 is pressed, the system queries the operator to enter the appropriate password for changing the level of access to parameter management.

The password can be entered with the arrow keys and then confirmed with the key 8

If the password is correct, the display will show a message to that effect, along with the new level of access.

If an incorrect password is entered, the following message is displayed

In both case, pressing the ◄ key returns navigation to the current level.

The following passwords can be employed by the user.

Level	Password
1	-
2	LEV02
3	LEV03
4	LEV04

If the keyboard is not used for 3 minutes, the system returns to level 1, and no data can be changed that requires a higher level of access, unless the operator re-enters the password providing access to the higher level.

9.10 Navigation on the standard menu

To gain access to the various sub-menus from the main menu, press the ► key. To return to the next higher level, press ◄.

Pressing the up arrow key ▲ moves the system to the previous item on the current menu. If the system is positioned on the first item on the menu, pressing the key will have no effect.

Pressing the down arrow key ▼moves the system to the next item on the current menu. The end of the list of

items on the menu is indicated by a line consisting of minus signs -------.

A description of the structure and items that constitute the user interface is created with tables similar to the following table.

Each table is associated with a sub-menu and contains the same number of lines as the number of items on that sub-menu. The columns have the following meanings:

Menu

The number indicates the position of the item in the hierarchical structure. The first number on the left shows the item on the first sub-menu where the described parameter is accessed, the second number shows the position on the second sub-menu that has been accessed, and so on until the last number on the right, which shows the position of the item selected on the current sub-menu. For example, 1.3.5 shows that in order to access the item described on the table, the first item on the first sub-menu that has been accessed from the main menu must be selected, and then the third item on the following sub-menu must be selected and finally the fifth item on the last menu must be selected.

Parameter

This number is the number of the corresponding modbus register.

Item

This field contains the text that is displayed on the keyboard when the system enters the menu being described. If the displayed text is longer than the 8 characters that can be displayed, it is scrolled to enable the operator to read it completely (unless the associated parameter is being modified).

If the parameter is being modified, the first 8 characters of the text on the table is displayed without scrolling.

Display

A number in this field shows that the current item cannot be displayed unless a special condition is met that is described in the following table of display conditions.

If the display conditions on the menu are not met, navigation will move from the previous item to the next item without display of the menu item in question.

Level

Modifying a parameter (or, generally speaking, a specific action associated with a particular menu item) may require the entry of a password.

A number in this field shows the minimum level of access required for performing the action associated with the menu being described.

Condition

Modifying a parameter (or, generally speaking, a specific action associated with a particular menu item) may require that certain conditions be met, such as the need for the drive to be disabled.

A number (or numbers) in this field shows which of the conditions described on the conditions table must be met before the action associated with the menu being described can be performed.

Type

This field shows the method of accessing the parameter from the display. The following is a list of possible characters or symbols, and their meanings:

RO: The parameter is read-only and cannot be changed.

►: The item displayed is part of the menu, and lower levels on the menu hierarchy can be accessed by pressing ►.

8: The displayed item can be used to modify the associated parameter or to access a function by pressing the key 8.

P⏭: The displayed item can be used to start a procedure by pressing the key ⏭. At the end of the procedure, its result up to the press of the ◄ key is displayed.

Unit

This is the unit of measurement for the amount displayed. The – symbol means that the value is dimensionless.

Range

This is the range of values which a parameter can have

Default

This value is the factory setting for the parameter, which is restored after a parameter reset.

9.11 Structure of sub-menus

9.11.1 MAIN MENU →

PARAM			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	This section lists all the items that are used to set the parameters for the drive, along with the display of the measurements				

SAVE PARAMETER			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
2	32842	-	2	-	**P** ⏩
	Unit	Range		Default	
	-	-		-	
	Used to save the current set of parameters in non-volatile memory.				

SAVE PROFILES			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
3	32843	-	2	-	**P** ⏩
	Unit	Range		Default	
	-	-		-	
	Used to save the current set of profiles in non-volatile memory.				

LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
4	-	-	-	-	⏩
	Unit	Range		Default	
	-	-		-	
	Changes the level of access, see par. 9.9.				

9.11.2 MAIN MENU → PARAM →

MEASURE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Provides access to the measurements read by the device				

STATUS			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Provides access to information on the status of the device.				

CONTROL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to set parameters associated with the operating mode of the device				

MOTOR			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.4	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to set parameters associated with the motor connected to the device				

SERVICE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.5	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Provides access to certain parameters and manual commands that are locally set/given				

D-BRAKE			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.6	-	3	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Provides access to a set of parameters associated with external braking resistance.				

DRIVE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	-	-	-	-	▶

1.7	Unit	Range		Default	
	-	-		-	
	Used to display parameters associated with the drive.				
FEEDBACK			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.8	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Provides access to parameters and to the procedure associated with the position sensor on the motor.				
PROFILES			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.9	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to manage the movement profiles.				
MODBUS			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.10	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to set parameters for communication over the modbus.				
VISIO			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.11	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to access parameters associated with the display.				
IN / OUT			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to access parameters associated with the inputs and outputs on the device.				
H-BRAKE			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.13	-	-	-	-	▶
	Unit	Range		Default	
	-	-		-	
	Used to access parameters associated with managing the electromechanical brake.				

9.11.3 MAIN MENU → PARAM → MEASUREMENTS

V IN RMS			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.1	-	-	-	-	RO
	Unit	Range		Default	
	V rms	-		-	
	Displays the voltage in V RMS calculated for the input on the device.				

VBUS DC			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.2	380	-	-	-	RO
	Unit	Range		Default	
	V	-		-	
	Displays the DC voltage on the DC bus on the device.				

VBUS DC MIN			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.3	32784	-	-	-	RO
	Unit	Range		Default	
	V	-		-	
	Displays the minimum value of the DC voltage on the DC bus when the device is enabled.				

VBUS DC MAX			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.4	32800	-	-	-	RO
	Unit	Range		Default	
	V	-		-	
	Displays the minimum value of the DC voltage on the DC bus.				

I RMS [A]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.5	84	-	-	-	RO
	Unit	Range		Default	
	A RMS	-		-	
	Displays the current on the phase being measured.				

I RMS MAX [A]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.6	32890	-	-	-	RO
	Unit	Range		Default	
	A RMS	-		-	
	Displays the maximum current on the phase being measured.				

IQ RMS [A]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.1.7	32945	4	-	-	RO

	Unit	Range		Default	
	A RMS	-		-	
	Displays the value of component Q in the current on the rotating reference system.				
I RMS MAX [A]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.1.8	32946	4	-	-	RO
	Unit	Range		Default	
	A RMS	-		-	
	Displays the maximum value of component Q in the current on the rotating reference system.				
ID RMS [A]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.1.9	32947	4	-	-	RO
	Unit	Range		Default	
	A RMS	-		-	
	Displays the value of component A in the current on the rotating reference system.				
ID RMS MAX [A]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.1.10	32948	4	-	-	RO
	Unit	Range		Default	
	A RMS	-		-	
	Displays the maximum value of component D in the current on the rotating reference system.				
SPEED [rpm]			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.11	40	-	-	-	RO
	Unit	Range		Default	
	RPM	-		-	
	Displays the maximum speed measured by the servo drive				
SPEED MAX [rpm]			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.12	32926	-	-	-	RO
	Unit	Range		Default	
	RPM	-		-	
	Displays the maximum speed measured by the servo drive.				
FREQ OUT [hz]			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.13	32951	-	-	-	RO
	Unit	Range		Default	
	Hz	-		-	
	Displays the frequency of the voltage applied to the motor				
FREQ OUT MAX[hz]			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type

1.1.14	32952	-	-	-	RO
	Unit	Range		Default	
	Hz	-		-	
	Displays the maximum frequency of the voltage applied to the motor				
DRIVE TEMP			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.15	384	-	-	-	RO
	Unit	Range		Default	
	°C	-		-	
	Displays the temperature of the power module in the device.				
DRIVE TEMP MAX			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.16	32903	-	-	-	RO
	Unit	Range		Default	
	°C	-		-	
	Displays the maximum temperature of the power module in the device.				
MOTOR TEMP			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.17	383	7	-	-	RO
	Unit	Range		Default	
	°C	-		-	
	Displays the motor temperature.				
MOTOR TEMP MAX			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.18	32902	7	-	-	RO
	Unit	Range		Default	
	°C	-		-	
	Displays the maximum motor temperature measured.				
TORQUE [Nm]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.1.19	-	4	-	-	RO
	Unit	Range		Default	
	Nm	-		-	
	Displays the torque value resulting from a calculation based on the current delivered and the motor torque constant, parameter 35168.				
APPLIED SLIP			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.1.20	32976	22			RO
	Unit	Range		Default	
	RPM	-		-	
	Displays the slip applied during operation with an asynchronous motor and feedback				

APPLIED SLIP MAX			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.21	32977	22	-	-	RO
	Unit	Range		Default	
	RPM	-		-	
	Displays the maximum slip applied during operation with an asynchronous motor and feedback				

MOT VOLTAGE OUT			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.1.22	32958	-	-	-	RO
	Unit	Range		Default	
	phase-phase V RMS	-		-	
	Displays the motor temperature.				

MEASURE RESET			Miniaction 300		Miniaction 500
Menu	Procedure	Display	Level	Condition	Type
1.1.23	32785	-	-	-	**P** ⏩
	Unit	Range		Default	
	-	NO - YES		NO	
	Zeros the minimum and maximum values saved for measurements that have min/max values when YES is selected and then confirmed by pressing the key 8				

9.11.4 MAIN MENU → PARAM → STATUS

DRIVE STATE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.1	-	-	-	-	RO
	Unit	Range		Default	
	-	-		-	

Displays the status of the device on the second line of the display, which can be any of the messages shown on the table

NO POWER	The main power feed to the device is shut off
DISABLED	The servo drive is disabled: the main power is on, and the device is ready for the enabling command
ENABLED	The servo drive is enabled

or, if an error has occurred, the message

ERROR xx

Where xx is the error number. The error codes are listed on table 10.2.

DIG INPUT 8 - 1			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.2	-	-	-	-	RO
	Unit	Range		Default	
	-	-		-	

Displays the logic level of the first 8 digital inputs, as based on the logic level assigned to each input on the input/output menu, which is described below.

Each digit on the second line of the display shows the logic level of the corresponding digital input.

The number 1 means that the input is active; 0 means it is not.

The digit farthest to the right is associated with digital input 1. The digit farthest to the left is associated with digital input 8 (T_ENABLE).

DIG INPUT 16 - 9			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.3	-	-	-	-	RO
	Unit	Range		Default	
	-	-		-	

See the description in the preceding entry.

The digit farthest to the right is associated with digital input 9 (V_ENABLE). The digit farthest to the left is associated with digital input 16 (DIR_IN).

IN 0 - 10 [mV]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.4	35005	-	-	-	RO
	Unit	Range		Default	

	mV	-		-	
	Displays the value of the 0-10 V voltage on the analogue input.				
IN 4 - 20 [mA]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.5	35006	-	-	-	RO
	Unit	Range		Default	
	mA	-		-	
	Displays the value of the 4-20 mA current on the analogue input.				
LAST ERROR			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.6	-	-	-	-	RO
	Unit	Range		Default	
	-	-		-	
	Displays the error codes for the last 8 error events detected by the device. The most recent error is on the left in the scrolling presentation. The display sequence is repeated continuously, but a short pause is left at the end of each scroll cycle.				
ERROR LIST CLEAR			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.2.7	32811	-	-	-	**P** ⏩
	Unit	Range		Default	
	-	NO - YES		NO	
	Zeros the list of fault codes stored by the device when YES is selected and then confirmed by pressing key 8				

9.11.5 MAIN MENU → PARAM → CONTROL

CONTROL MODE			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.3.1	32944	-	-	-	RO
	Unit	Range		Asynchronous default	Synchronous default
	-	1 - 2		1	2
	Displays the type of motor controlled by the servo drive: 1: V/f Asynchronous motor. 2: MOT SYNC Synchronous motor.				

MOTOR CONTROL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.2	35165	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1 - 2 - 3		1	
	Selects the type of active control: 0: TORQUE Torque control with limitation on maximum speed is applied. 1: SPEED Speed control is applied. 2: PROFILE The type of control specified in the specific movement profile is applied. 3: PD_REF Position control with external reference tracking is applied.				

CONTROLLER			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.3	35166	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1 - 2		2	
	Used to set the active controller on the device. The following can be selected: 0: MODBUS Modbus is the active controller. 1: KEYBOARD The keyboard is the controller. 2: DIG I/O The digital inputs are the active controller. The active controller controls motor movement and can modify parameters that can be changed only by the active controller.				

SPEED REF SOURCE			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.4	35167	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1 - 2		0	
	Used to set the source of the speed reference when speed control is applied to the motor. The following can be selected: 0: FIXED The speed reference is fixed and assumes the value set in the next entry. 1: KEY U/D The speed reference is fixed and assumes the value set in the next entry. It				

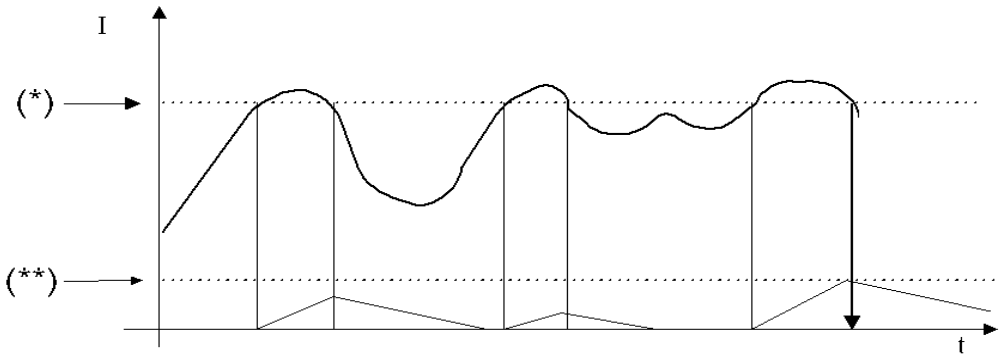
	can be set with the ▲▼ keys, which change the speed reference described in the subsequent entry, but do not save the changes. 2: AN REF The speed reference is obtained from the analogue value on the input of the drive according to a proportional type of equation that will be described in detail in the section on inputs and outputs.

SPEED REF			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.5	35157	-	2	-	⏩
	Unit	Range		Default	
	RPM	-6000 - 6000		0	
	This parameter is the speed reference. It is used when speed control is applied to the motor and the reference (see preceding entry) is either fixed or can be varied from the keyboard. It is expressed in RPM.				

ACC TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.6	35107	-	2	-	⏩
	Unit	Range		Default	
	ms	5 - 10000		2000	
	This parameter sets the acceleration applied when speed control is applied to the motor. It is the time required for going from 0 speed to maximum speed, parameter 35111.				

DEC TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.7	35108	-	2	-	⏩
	Unit	Range		Default	
	ms	5 - 10000		2000	
	This parameter sets the deceleration applied when speed control is applied to the motor. It is the time required for going from maximum speed, parameter 35111, to a stop at 0 speed.				

I TIME LIMIT			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.8	32771	-	2	-	⏩
	Unit	Range		Default	
	ms	0 - 65535		2000	
	This register sets the maximum time that the current threshold can be exceeded.				



(*) Current threshold

(**) Time limit

If the current level exceeds nominal motor or servo drive current, and this condition persists for longer than the time set with this parameter, an error occurs on the drive.

This is a safety function provided to the user for protecting the application.

The error code associated with this protection feature is 18.

MOT DIRECTION			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.9	32961	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to set the direction of motor rotation between: 0: NORMAL Rotation is clockwise with positive speed or torque reference. 1: INVERTED Rotation is anti-clockwise with positive speed or torque reference. This parameter can also be accessed from menu 1.5.3.				

JOG SPEED			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.10	35109	-	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 6000		100	
	Sets the speed of rotation associated with the jog movement command.				

SPEED MAX			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.11	35111	-	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 6000		4000	
	This parameter sets the maximum speed. It is the limit speed when active torque control is applied. This parameter affects the acceleration ramps and stop ramps, and the maximum speed that				

	can be set if the source of the speed reference is KEY U/D				
JOG RAMP TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.12	35114	-	2	-	⏩
	Unit	Range		Default	
	ms	5 - 10000		20	
	This parameter sets the acceleration and deceleration when the jog movement command is active. It is the time required for going from 0 speed to jog speed.				
QUICK STOP TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	
1.3.13	35163	-	2	-	⏩
	Unit	Range		Default	
	ms	5 - 10000		20	
	Sets the quick deceleration ramp. This parameter sets the time required for going from maximum speed to stop. This ramp is executed when a limit switch is tripped or on deceleration during jog movement.				
POS RATIO NUM			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.14	35115	-	2	D	⏩
	Unit	Range		Default	
	-	1 - 2147483647		655360000	
	This parameter and the subsequent parameter are used to set the conversion ratio between the internal position unit (65536 pulses / revolution) and the desired position unit. This value in particular must be programmed to a value that is higher than the subsequent parameter; otherwise, error 35 will be signalled on the drive. For example: MOTOR DIRECTLY DRIVING A BALL SCREW with pitch of 10 mm. Each motor revolution corresponds to 10 mm of forward motion; therefore, to program the distances in mm, the conversion factor is 65536 / 10, and the values to be programmed are: P 35115 = 655360000 P 35117 = 100000				
POS RATIO NUM			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.15	35117	-	2	D	⏩
	Unit	Range		Default	
	-	1 - 2147483647		10000	
	This parameter is the denominator of the position unit conversion factor. See the description of the last parameter above.				
POSITION MODULE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
01.3.16	35169	-	2	C, D	⏩

	Unit	Range		Default	
	User-selected position unit	Variable, depends on position factor		60000.0000	
	This parameter is used to program the position module with the position unit selected by the user. The position value in the unit selected by the user can assume values within the interval [- Position module/ 2, + Position module/ 2).				
PWM FREQ		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.17	32913	-	3	D	⏩
	Unit	Range		Default	
	Hz	5000 – 100000 - 15000		5000	
	This parameter sets the PWM frequency. The parameter can be written with any value between 5000 and 15000. The PWM frequency that will be applied is the value allowed by the system that is closest to the requested value.				
HOMING TYPE		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.18	35135	-	2	-	⏩
	Unit	Range		Default	
	-	1 - 35		35	
	This parameter is used to choose the type of homing procedure to be run when searching for the home position. For further information on homing procedures, see the relative section in this manual.				
HOMING SW SPEED		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.19	35122	-	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 1000		100	
	Sets the speed during searches for switches during the homing procedure.				
HOMING Z SPEED		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.20	35123	-	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 1000		10	
	Sets the final positioning speed during the homing procedure.				
HOMING RAMP TIME		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.21	35124	-	2	-	⏩
	Unit	Range		Default	
	ms	5 - 10000		30	
	Sets the acceleration and deceleration applied during homing procedures. This parameter is the time required for accelerating from standing start to the switch search speed programmed				

	with parameter 35122.				
HOME POS OFFSET			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.22	35125	-	2	D	⏩
	Unit	Range		Default	
	User-selected position unit	Variable, depends on position factor		0	
	This position value is assigned to the current position at the end of the homing procedure				
CURRENT WINDOW			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
01.3.23	35144	-	2	-	⏩
	Unit	Range		Default	
	mA	1 - 10000		50	
	Sets the amplitude of the window for the target current. See the note at the end of this section				
CURRENT W TIME			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.24	35145	-	2	-	⏩
	Unit	Range		Default	
	ms	1 - 65000		100	
	Sets the wait time for the target current. See the note at the end of this section				
SPEED WINDOW			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.25	35146	-	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 1000		50	
	Sets the amplitude of the window for the target speed. See the note at the end of this section				
SPEED W TIME			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.26	35147	-	2	-	⏩
	Unit	Range		Default	
	ms	1 - 65000		100	
	Sets the wait time for the target speed. See the note at the end of this section				
POSITION WINDOW			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.27	35148	-	2	-	⏩
	Unit	Range		Default	
	User-selected position unit	Variable, depends on position factor		20	
	Sets the amplitude of the window for the target position. See the note at the end of this section				
POSITION W TIME			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type

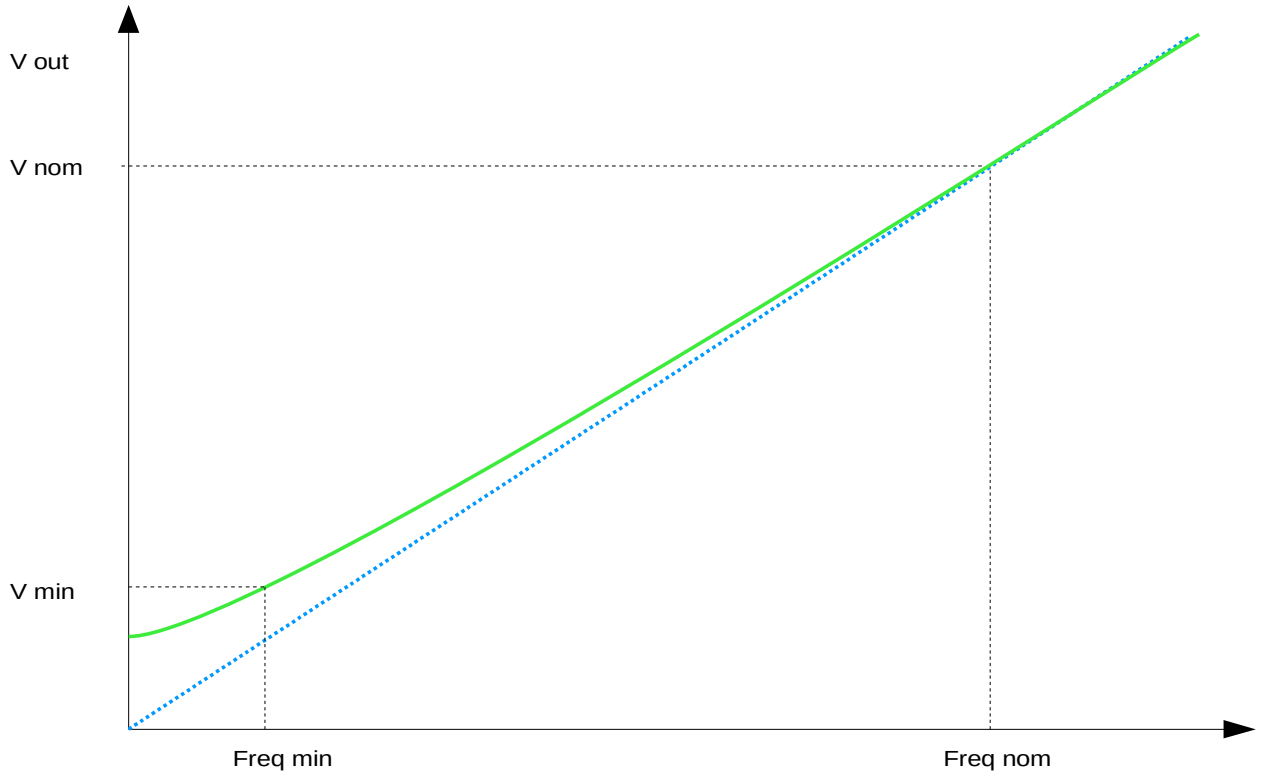
1.3.28	35150	-	2	-	⏩
	Unit	Range		Default	
	ms	1 - 65000		100	
	Sets the wait time for the target position. See the note at the end of this section				
SPEED WARNING			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.29	32963	-	2	-	⏩
	Unit	Range		Default	
	RPM	0 - 6000		0	
	This parameter sets warning C2DMAN_VEL_WARNING to be signalled if the measured speed differs from the speed reference by more than the programmed threshold. The control is active even during acceleration ramps. The warning is disabled when 0 is set for this parameter				
SPEED ERROR			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.30	32964	-	2	-	⏩
	Unit	Range		Default	
	RPM	0 - 6000		0	
	This parameter sets error C1DMAN_VEL_ERROR to be signalled if the measured speed differs from the speed reference by more than the programmed threshold. The control is active even during acceleration ramps. The warning is disabled when 0 is set for this parameter				
POSITION WARNING			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.31	35153	-	2	-	⏩
	Unit	Range		Default	
	User-selected position unit	0 - Variable, depends on position factor		0	
	When position control is enabled: if the current position differs from the reference by a value exceeding the value set with this parameter, position warning C2D_EXCESSIVE_POS_DEV_WARNING is generated. The warning is disabled when 0 is set for this parameter				
POSITION ERROR			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.3.32	35155	-	2	-	⏩
	Unit	Range		Default	
	User-selected position unit	0 - Variable, depends on position factor		0	
	When position control is enabled: if the current position differs from the reference by a value exceeding the value set with this parameter, position error C1D_EXCESSIVE_POS_DEV_ERROR is generated.				

	The error notification is disabled when 0 is set for this parameter.				
FREQ MIN BOOST			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	32910	9	2	C	⏩
	Unit	Range		Default	
	Hz	1 – 128		0	
1.3.33	This parameter sets the minimum frequency used to establish the V/f curve with which the voltage supplied to the motor is determined as a function of generated frequency when an asynchronous motor is being controlled. See the description at the end of this table V/f profile.				
FREQ NOM BOOST			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	32911	9	2	C	⏩
	Unit	Range		Default	
	Hz	1 – 128		50	
1.3.34	This parameter sets the nominal frequency used to establish the V/f curve with which the voltage supplied to the motor is determined as a function of generated frequency when an asynchronous motor is being controlled. See the description at the end of this table V/f profile.				
VRMS MIN BOOST			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	32908	9	2	C	⏩
	Unit	Range		Default	
	V	0 - 100		0	
1.3.35	This parameter sets the minimum voltage used to establish the V/f curve with which the voltage supplied to the motor is determined as a function of generated frequency when an asynchronous motor is being controlled. See the description at the end of this table V/f profile.				
VRMS NOM BOOST			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	32909	9	2	C	⏩
	Unit	Range		Default	
	V	100 - 350		230	
1.3.36	This parameter sets the nominal voltage used to establish the V/f curve with which the voltage supplied to the motor is determined as a function of generated frequency when an asynchronous motor is being controlled. See the description at the end of this table V/f profile.				
ASI SPEED MIN			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.37	32959	19	2	D	⏩
	Unit	Range		Default	

	RPM	0 - 6000		0	
	This parameter sets the minimum speed when an asynchronous motor is being controlled.				
ASI SPEED MAX			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.38	32960	19	2	D	⏩
	Unit	Range		Default	
	RPM	0 - 6000		6000	
	This parameter sets the maximum speed when an asynchronous motor is being controlled.				
DC BRAKE VOLTAGE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.39	32973	19	2	-	⏩
	Unit	Range		Default	
	V	0 - 120		30	
	This parameter sets the DC voltage supplied to the motor at the end of the deceleration ramp to obtain an easier stop.				
DC BRAKE TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.40	32918	19	2	-	⏩
	Unit	Range		Default	
	ms	0 - 4000		500	
	This parameter sets the duration of motor braking at the end of the deceleration ramp, with supply of DC voltage to obtain an easier stop.				
P/D NUM RATIO			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.3.41	35119	-	2	D	⏩
	Unit	Range		Default	
	-	-32768 - 32767		128	
	This parameter is the numerator of the ratio between the internal position resolution of 65536 steps/revolution and the number of command pulses associated with a revolution made by the motor.				
P/D DEN RATIO			Miniaction 300		Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.3.42	35120	-	2	D	⏩
	Unit	Range		Default	
	-	0.01 – 655.35		1.00	
	This parameter is the denominator of the ratio between the internal position resolution of 65536 steps/revolution and the number of command pulses associated with a revolution made by the motor				

V/f profile



The simplified equivalent circuit of a motor phase consists of a RL series circuit. The current without load is:

$$I = \frac{V/\sqrt{3}}{\sqrt{R^2 + (2\pi fL)^2}}$$

The drive can obtain a curve that satisfies the above equation using two points derived from pairs of values (Freq min; V mn) and (Freq nom; V nom) that can be parameterised by the user.
The purpose of increasing the voltage supplied to the motor at low generated frequencies is to compensate for the effects of coil resistance in order to keep current constant.

If the user enters incorrect parameters (for example, the user places the point derived from the pair of values (Freq min; V min) below the blue dotted line, the drive will supply voltage as a function of generated frequency according to the rule described by the blue dotted line.

To parameterise the motor correctly, start it under no-load conditions at the nominal frequency and set nominal boost voltage and frequency as indicated on the motor's identification plate. Write down the current drawn by the motor under these conditions. Decrease the rotation frequency of the motor and set the parameters for minimum boost voltage and frequency so that the motor draws the current value previously written down.
Check that the current delivered is virtually constant throughout the range of use.

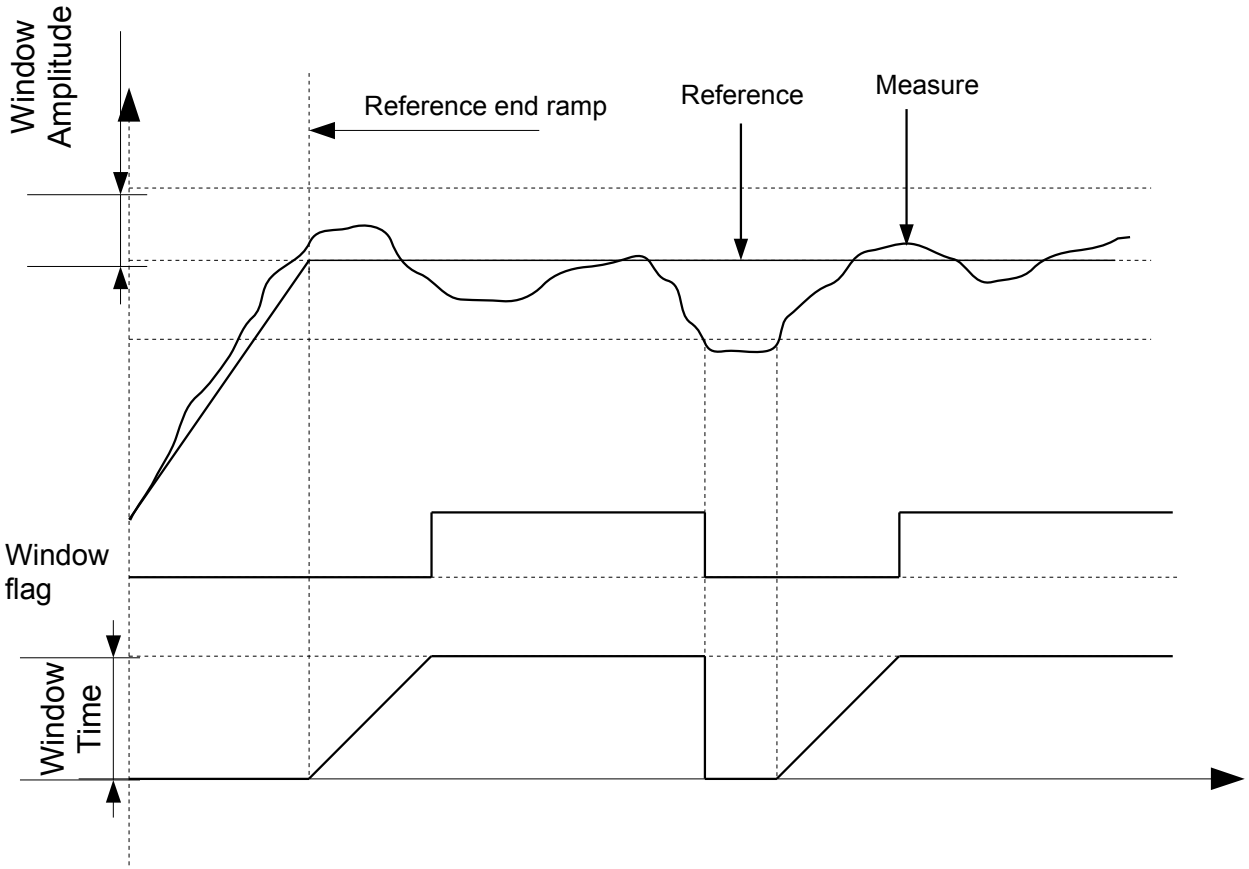
If freq min = 0 is set, voltage Vmin can be obtained with the following formula: $V\,min = \frac{\sqrt{3}}{2} \cdot Rm \cdot Inom$

With Rm resistance measured across the two motor terminals

$Inom$ nominal current under no load

Current, speed and position window.

During operation, the drive can monitor current delivered, motor RPM and current position.
The user can manage certain digital signals by setting controls on these measurements.
A measurement is controlled according to the following scheme:



If the measured value of the specific measurement reaches the programmed reference value (at the end of the ramp, if applicable) and differs from the reference value by an amount that is less than the amplitude of the acceptance window (which can be set by the user), as indicated in the figure as *Window Amplitude*), the wait time is increased within the acceptance window.
When the wait time within the acceptance window reaches the value shown in the figure with the Window Time (which can be set by the user), a digital signal is sent that is associated with the measurement in question.
If the measurement differs from the reference value by an amount that is greater than the acceptance window, the associated digital signal is immediately zeroed.
The user can access the generated digital signal in 2 ways:

- By assigning a digital output to the signal.
- By reading the content of register 12 over the modbus

9.11.6 MAIN MENU → PARAM → MOTOR

BS 80/50 1,200 Nm	Miniaction 300	Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.4.1	35121,35164	-	2	C, D	⏩
	Unit	Range		Default	
	-	0 – N. of preloaded motors		0	
	This item is used to select the active motor from those stored in the device. Selecting a motor is equivalent to writing all motor parameters using the values stored in the device, without saving them. Of one of these parameters is modified, the following is displayed instead of the name of the motor: CUSTOM SETTINGS to show that at least one programmed motor parameter is different from the last motor loaded. After a reset, the selected motor is the default motor, and the index for the selected motor is 0. In this condition, the following is displayed: DEFAULT SETTINGS				

KT [Nm/A]	Miniaction 300

Menu	Parameter	Display	Level	Condition	Type
1.4.2	35168	10	2	D	⏩
	Unit	Range		Default	
	Nm / A	0 – 10.000		0	
	This parameter is used to set the torque constant for the motor. The parameter is used exclusively to display the torque applied to the motor. It does not affect the behaviour of the application, which expresses the torque reference as a current if torque control is being applied to the motor.				

I RMS NOM [mA]	Miniaction 300	Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.4.3	111	-	2	CM	⏩
	Unit	Range		Default	
	mA RMS	0 - 65000		200	
	This parameter sets nominal motor torque				

I RMS MAX [mA]	Miniaction 300	Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.4.4	109	-	2	CM	⏩
	Unit	Range		Default	
	mA RMS	0 - 45000		707	
	This parameter sets maximum motor current. See Note 1.				

SPEED MAX [rpm]	Miniaction 300	Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.4.5	32954	-	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 8000		100	
	This parameter sets maximum motor speed. If this value is exceeded, the drive will shut down, and error 16 will be signalled.				

TEMP PROBE TYPE	Miniaction 300	Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.4.6	35100	-	2	D	⏩
	Unit	Range		Asynchronous default	Synchronous default
	-	0 - 1 - 2 - 3		0	2
	This parameter sets the type of temperature sensor installed on the motor. 0: NONE No temperature sensor installed. No motor overheating error is signalled. 1: B57227K NTC temperature sensor, model Epcos B57227K. A motor overheating error is signalled when motor temperature exceeds the temperature threshold programmed with the next parameter 2: NC Normally closed bimetallic temperature sensor. When the contact opens, the drive shuts off and error 36 is signalled. 3: PTC PTC temperature sensor. If a PTC sensor is used as the temperature sensor, a warning and motor temperature error will occur. To be specific: -If the temperature is 20°C lower than the rated temperature of the PTC sensor, all warnings will be cancelled -If the motor temperature is 5 to 20°C lower than the rated temperature of the PTC sensor, a temperature warning will occur -If the motor temperature is close to (+/- 5°C) the rated temperature of the PTC sensor, the drive will shut off and error 36 will be signalled				

TEMP MAX	Miniaction 300	Miniaction 500

Menu	Parameter	Display	Level	Condition	Type
1.4.7	35101	7	2	-	⏩
	Unit	Range		Default	
	°C	0 - 155		140	
	If a B57227K motor temperature sensor is used, a maximum operating temperature threshold can be set for the motor.				

	If the drive measures a motor temperature that exceeds the programmed threshold, the drive will shut off and error 36 will be signalled. A motor temperature warning is signalled if motor temperature exceeds the value that is 10°C lower than the programmed threshold.

PAIR POLE NUMBER			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.4.8	32953	-	2	D	⏩
	Unit	Range		Asynchronous default	Synchronous default
	-	1 - 4		1	2
	Set This parameter can be automatically determined by the drive using the position feedback calibration procedure.				

KP CUR [V/A]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.4.9	106	10	2	-	⏩
	Unit	Range		Default	
	V / A	0 - 65535		0	
	Sets the proportional current gain in the current control loop. Expressed in volts/amp.				

KI CUR [KV/sA]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.4.10	107	10	2	-	⏩
	Unit	Range		Default	
	KV / (A * s)	0 - 65535		0	
	Sets the additional current gain in the current control loop. Expressed in kV/(Amp.*/sec.)				

KP SPD [mA/rpm] KP SPD [ ]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.4.11	100	9 or 10	2	-	⏩
	Unit	Range		Default	
	mA / RPM	0 - 65535		0	
	Sets the proportional speed gain in the speed control loop. Expressed in [mA /RPM] for synchronous motors. It has no unit for asynchronous motors, since the speed error expressed in RPM is the factor controlling applied slip, which is also expressed in RPM.				

KI SPD [mA/srpm] KI SPD [/s]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	
1.4.12	101	9 or 10	2	-	⏩
	Unit	Range		Default	

	mA / (s * rpm)	0 - 65535		0	
	Sets the additional speed gain in the speed control loop. Expressed in [mA /(second* RPM] for synchronous motors. Expressed in [1/second] for asynchronous motors.				
KP POS [Krpm/G]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.4.13	104	13	2	-	⏩
	Unit	Range		Default	
	K rpm / Revolution	0 - 65535		0	
	Sets the proportional position gain in the position control loop. Expressed in thousands of RPM/motor revolution.				
KD POS [s rpm/G]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.4.14	32769	13	2	-	⏩
	Unit	Range		Default	
	s * rpm / Revolution	0 - 65535		0	
	Sets the derived position gain in the position control loop. Expressed in (seconds * rpm) / motor revolution.				
MAX SLIP [rpm]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.4.15	32974	22	2	-	⏩
	Unit	Range		Default	
	RPM	10 - 3000		200	
	Sets the maximum slip applied to the motor if it is asynchronous and feedback is applied.				

Note 1 : The programmed maximum motor current affects the maximum current supplied to the motor. Thus, in order to meet the dynamic demands required by the desired motion, the drive limits the current to the value set for parameter 109.

The drive can supply a maximum peak current of 15 amps. If this value is exceeded, the maximum current protection system will trip and error no. 9 will be signalled.

As a result, do not set maximum motor current parameter 109 to a value exceeding:

$$15\,A\ peak/\sqrt{2}\simeq 10.6\,Arms$$

If this value is exceeded, the protection system on the drive may trip when the motor is required to accelerate abruptly.

For this reason, maximum current for the BS 80/100 motor is set at set at 10 A, even though the motor can withstand currents of up to 14.7 A.

9.11.7 MAIN MENU → PARAM → MOTOR

DRIVE STATE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.5.1	-	-	-	-	RO
	Unit	Range		Default	
	-	-		-	
	Displays the status of the device on the second line of the display, which can be any of the messages shown on the Servo Drive Status Table or, if an error occurs, displays the following message ERROR xx				

ERROR RESET			Miniaction 300		Miniaction 500
Menu	Procedure	Display	Level	Condition	Type
1.5.2	99	-	-	-	P ⏩
	Unit	Range		Default	
	-	NO - YES		NO	
	Resets error notifications after YES is selected and confirmed with **8**				

MOT DIRECTION			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.5.3	32961	2	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to set the direction of motor rotation between: 0: NORMAL Rotation is clockwise with positive speed or torque reference. 1: INVERTED Rotation is anti-clockwise with positive speed or torque reference. This parameter can also be accessed from menu 1.3.9.				

H-BRAKE COMMAND			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.5.4	32970	20	2	C	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to manually control the dedicated output for the holding brake 0: HOLD Holding brake output disabled. 1: RELEASE Holding brake output enabled.				

9.11.8 MAIN MENU → PARAM → D-BRAKE

USE EXT BRAKE			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.6.1	32827	3	3	D, CM	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to enable the dedicated output for braking resistance: 0: DISABLED Braking resistance output disabled. 1: ENABLED Braking resistance output enabled.				

RESISTANCE			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.6.2	32828	3	3	D, CM	⏩
	Unit	Range		Default	
	Ohm	30 - 500		200	
	Used to set the value of an externally connected braking resistor.				

POWER NOM [W]			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.6.3	32831	3	3	D, CM	⏩
	Unit	Range		Default	
	Watt	1 - 20000		1500	
	Used to set the nominal power of an externally connected braking resistor.				

9.11.9 MAIN MENU → PARAM → DRIVE

IRMS NOM [mA]		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.7.1	112	-	-	-	RO
	Unit	Range		Default	
	mA	-		As a function of PWM.	
	Displays the nominal current speed that can be delivered by the servo drive. This value varies with the PWM frequency used. See the PWM VALUES ALLOWED table for information on downgrading as a function of PWM frequency.				

I PEAK MAX [mA]		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.7.2	110	-	-	-	RO
	Unit	Range		Default	
	mA	-		15000	
	Displays the peak current that can be delivered by the drive.				

9.11.10 MAIN MENU → PARAM → FEEDBACK

FEEDBACK TIPE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.8.1	32905	-	2	CM, D	⏩
	Unit	Range		Asynchronous default	Synchronous default
	-	0 – 1 - 2*		0	2
	Used to set the type of angular transducer installed on the motor. 0: NONE No transducer installed. 1: INC ENCODER Incremental encoder. 2: RESOLVER Resolver, *Can be used only with the Miniaction 300.				

FEEDBACK DIR			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.8.2	32904	13	2	CM, D	⏩
	Unit	Range		Default	
	-	0 - 1		1	
	Used to assign direction of angular rotation to the transducer. 0: NORMAL Positive value: anti-clockwise. 1: INVERTED Positive value: clockwise.				

MOT CABLE DIR			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.8.3	32955	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to assign direction of rotation set by wiring of motor phases. This parameter is automatically obtained by the drive during calibration. However, the user can set it to facilitate drive replacement by eliminating the need for recalibrating the angular transducer 0: POS DIR Motor rotates in the direction imposed by the wiring. 1: NEG DIR Motor rotates in the direction opposite the direction imposed by the wiring.				

PHASE OFFSET			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.8.4	32957	24	2	D	⏩
	Unit	Range		Default	
	-	0 - 65535		11100	
	This parameter expresses the phase offset between the angle provided by the angular transducer and the electrical phase. This parameter is automatically obtained by the drive during calibration. However, the user can set it to facilitate drive replacement by eliminating the need for recalibrating the angular transducer				

	The value resulting from the calibration procedure may vary, as it depends on the starting position of the rotor.				
ENCOD RES			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.8.5	32914	14	2	CM, D	⏩
	Unit	Range		Default	
	Pulses/revolution	1 - 65536		512	
	Sets the resolution of the encoder installed on the motor.				
HALL DIRECTION			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.8.6	32956	23	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to assign direction of rotation set by the wiring of hall sensors on the motor. This parameter is automatically obtained by the drive during calibration. However, the user can set it to facilitate drive replacement by eliminating the need for recalibrating the angular transducer and/or to correct incorrect wiring of hall sensors. 0: POS DIR Motor rotates in the direction imposed by the wiring. 1: NEG DIR Motor rotates in the direction opposite the direction imposed by the wiring.				
CALIBRATE PHASE			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.8.7	35128	10	2	D	**P** ⏩
	Unit	Range		Default	
	-	NO - YES		NO	
	Runs the calibration procedure for the angular transducer installed on the motor: select YES and confirm with 8				
CALIBRATION			Miniaction 300		
Menu	Parameter	Display	Level	Condition	Type
1.8.8	32965	10	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to check whether the calibration procedure for the angular transducer has been run. The parameter is automatically modified by the drive at the end of the calibration procedure according to the outcome of the procedure. However, the user can set it to facilitate drive replacement by eliminating the need for recalibrating the angular transducer 0: NOT DONE Calibration has not been completed. 1: DONE Calibration has been completed				

9.11.11 MAIN MENU → PARAM → PROFILES

PROFILE NUMBER			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.1	-	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 127		0	
	The drive can store 128 movement profiles. In order to display and/or modify the value of a particular profile parameter, the profile must first be selected. This menu is used to select the movement profile that subsequent menus refer to.				

PROFILE TYPE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.2	-	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 8		2	
	Used to choose the type of movement profile from the following: 0: HOMING If this type of profile is selected, the profile runs the homing procedure 1: SPEED If this type of profile is selected, speed control with the specific target speed and acceleration/deceleration for the profile is applied to the motor. 2: ABS POS If this type of profile is selected, position control with the absolute reference position, maximum speed, acceleration and deceleration specified in the profile is applied to the motor. 3: REL POS If this type of profile is selected, position control with movement from previous target position and the maximum speed, acceleration and deceleration specified in the profile is applied to the motor. 4: TORQUE If this type of profile is selected, torque control with the specific reference torque and maximum speed limit for the profile is applied to the motor. 5: SHORTRUN If this type of profile is selected, position control with the absolute reference position, maximum speed, acceleration and deceleration specified in the profile is applied to the motor. Movement is in the direction which results in the shortest travel within the machine cycle. 6: CW RUN If this type of profile is selected, position control with the absolute reference position, maximum speed, acceleration and deceleration specified in the profile is applied to the motor. Movement is in the direction which increases the position value. 7: CCW RUN If this type of profile is selected, position control with the absolute reference position, maximum speed, acceleration and deceleration specified in the profile is applied to the motor. Movement is in the direction which decreases the position value. 8: PULS DIR If this type of profile is selected, position control with external reference position received through the pulse-direction inputs is applied to the motor. Motor position is acquired when the profile is run.				

ACC TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.3	-	11	2	D	⏩
	Unit	Range		Default	
	ms	5 - 10000		500	
	If the type of profile is different from a torque profile, this menu is displayed that can be used to set the acceleration time required for accelerating from 0 to the specific speed specified in the profile. This parameter is ignored if the profile is a homing profile.				

TORQUE REF			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.4	-	12	2	D	⏩
	Unit	Range		Default	
	mA - RPM	-10000 - 10000		500	
	If the profile is type 4: TORQUE, this menu is displayed that can be used to set the reference torque. The reference torque is expressed in mA for synchronous motors and in RPM for asynchronous motors.				

SPEED REF			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.5	-	-	2	D	⏩
	Unit	Range		Default	
	RPM	-6000* - 6000		600	
	Used to set the reference speed of the profile. If the profile is a torque profile, this value limits the rotation speed to the absolute value of this parameter. If the profile is a speed profile, this parameter sets the programmed speed. If the profile is a position profile (whether absolute or relative), this value limits rotation speed during movement to the absolute value of this parameter. This parameter is ignored if the profile is a homing profile. Note*: If the profile is a position profile, the speed entered must be positive.				

DEC TIME			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.6	-	11	2	D	⏩
	Unit	Range		Default	
	ms	5 - 10000		500	
	If the type of profile is different from a torque profile, this menu is displayed that can be used to set the deceleration time required for decelerating from the specific speed specified in the profile to 0. This parameter is ignored if the profile is a homing profile.				

PROF POS TARGET			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.7	-	-	2	D	⏩
	Unit	Range		Default	
	User-selected position unit	Depends on parameters 35115 and 35117		Profile number	
	This parameter is the (absolute or relative) position value used by the position profiles. It can thus express the position to be reached or the movement to be executed, depending on the type of movement selected on the PROFILE TYPE menu, 1.9.2.				

PROF NUM RATIO			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.8	-	21	2	D	⏩
	Unit	Range		Default	
	-	-32768 - 32767		128	
	This parameter is the numerator of the ratio between the internal position resolution of 65536 steps/revolution and the number of command pulses associated with a revolution made by the motor.				

PROF DEN RATIO			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.9	-	21	2	D	⏩
	Unit	Range		Default	
	-	0.01 – 655.35		1.00	
	This parameter is the denominator of the ratio between the internal position resolution of 65536 steps/revolution and the number of command pulses associated with a revolution made by the motor				

LOAD DEFAULT			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.9.10	35129	21	2	D	**P** ⏩
	Unit	Range		Default	
	-	NO - YES		NO	
	If the active controller is the digital inputs (parameter 35166 = 2), the following menu is displayed that can be used to reconfigure all the profiles to the default condition without saving them. To save the profiles in non-volatile memory, use procedure 3284, SAVE PROFILES , menu 3.				

9.11.12 MAIN MENU → PARAM → MODBUS

DEVICE ID			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.10.1	35191	-	2	D	⏩
	Unit	Range		Default	
	-	1 - 247		1	
	This parameter is used to program the modbus address of the device. To apply the change, all parameters must be saved using procedure 32842, and the drive must then be restarted.				

MODBUS TIMEOUT			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.10.2	35192	-	2	D	⏩
	Unit	Range		Default	
	ms	0 - 65535		1500	
	Used to set the timeout for modus communication. If the time elapsed since the last frame was received exceeds the time programmed with this parameter, the device will be disabled due to a communication timeout. If the parameter is set to 0, timeout detection is disabled.				

MODBUS BAUD RATE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.10.3	35193	-	2	D	⏩
	Unit	Range		Default	
	kbps	0 – 1 – 2 – 3 – 4 – 5		4: 57600	
	This parameter sets the speed of communication over the modbus. 0: 4800 1: 9600 2: 19200 3: 38400 4: 57600 5: 115200 To apply the change, all parameters must be saved using procedure 32842, and the drive must then be restarted.				

MODBUS PARITY			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.10.4	35194	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1 - 2		0	
	Used to set the parity bit for modbus communication 0: NONE The parity bit is set to 0. 1: ODD The parity bit in odd-numbered frames is set to 1				

	2: EVEN The parity bit in even-numbered frames is set to 1 To apply the change, all parameters must be saved using procedure 32842, and the drive must then be restarted.

MB NO LOC ENABLE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.10.5	35143	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to exclude local enabling commands when the modbus controller is active. 0: NO If the drive is being controlled remotely over the modbus bus, it will verify enabling commands over inputs T_ENABLE and V_ENABLE, and also verify remote enabling. 1: YES If the drive is being controlled remotely over the modbus bus, it will verify remote enabling commands, only.				

9.11.13 MAIN MENU → PARAM → VISIO

DISPLAY VALUE		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.11.1	35195	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 6		0	
	Used to select the information provided on the **standard menu**. 0: STATUS The standard menu displays the status of the drive. 1: SPEED The standard menu displays the speed of the motor. 2: I MOT The standard menu displays the current supplied to the motor. 3: V MOT The standard menu displays the phase voltage supplied to the motor. 4: INT TEMP The standard menu displays the temperature of the drive. 5: POSITION The standard menu displays the current position. 6: PROFILE The standard menu displays the profile being run.				

ALWAYS LIGHT ON		Miniaction 300		Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.11.2	35196	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to set the operating mode of the backlight in the display. 0: NO The back light in the display lights up when any key is pressed and shuts off if no command is given by the operator for 3 minutes. 1: YES The back light stays on.				

9.11.14 MAIN MENU → PARAM → IN / OUT

ANALOGUE IN SOURCE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.1	35136	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to select the active analogue input. 0: 0-10 V The active analogue input is the input with voltage range of 0 – 10 V. 1: 4-20 mA The active analogue input is the input with current range of 4 – 10 mA.				

IN OFFSET [mA]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.2	35138	16	2	-	⏩
	Unit	Range		Default	
	mA	0 - 19000		4000	
	Used to set the offset of the 4-20 mA analogue input. The menu is displayed if the current-type analogue input is active (parameter 35136 = 1). If the analogue input is lower than this value, the reference is zero. Note that the cancelling current offset enables the system to interface with sensors that have a 0-20 A output.				

IN OFFSET [mV]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.3	35137	15	2	-	⏩
	Unit	Range		Default	
	mV	0 - 9000		1000	
	Used to set the offset of the 0-10 V analogue input. The menu is displayed if the voltage-type analogue input is active (parameter 35136 = 0). If the analogue input is lower than this value, the reference is zero.				

TORQUE MAX VALUE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.4	35141	-	2	-	⏩
	Unit	Range		Default	
	mA - RPM	0 - 65535		200	
	This parameter is used to set the maximum reference torque delivered when active torque control has been selected as the operating mode (parameter 35165 = 0) and the reference is received through the analogue input (parameter 35167 = 2). The current (synchronous motor) or slip (asynchronous motor, V/f control) set with this parameter is the torque reference associated with the maximum value of the active analogue input.				

TORQUE MIN VALUE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type

	35142	-	2	-	⏩
	Unit	Range		Default	
	mA -rpm	0 - 65535		10	
1.12.5	This parameter is used to set the minimum reference torque delivered when active torque control has been selected as the operating mode (parameter 35165 = 0) and the reference is received through the analogue input (parameter 35167 = 2). The current (synchronous motor) or slip (asynchronous motor, V/f control) set with this parameter is the torque reference associated with the offset value of the active analogue input.				

SPEED MAX VALUE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35139	-	2	-	⏩
	Unit	Range		Default	
	RPM	0 - 6000		2000	
1.12.6	This parameter is used to set the minimum speed imposed when active speed control has been selected as the operating mode (parameter 35165 = 1) and the reference is received through the analogue input (parameter 35167 = 2). The speed set with this parameter is the speed reference associated with the maximum value of the active analogue input.				

SPEED MIN VALUE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35140	-	2	-	⏩
	Unit	Range		Default	
	RPM	0 - 6000		10	
1.12.7	This parameter is used to set the minimum speed imposed when active speed control has been selected as the operating mode (parameter 35165 = 1) and the reference is received through the analogue input (parameter 35167 = 2). The speed set with this parameter is the speed reference associated with the offset value of the active analogue input.				

OUT SOURCE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35105	-	2	-	⏩
	Unit	Range		Default	
1.12.8	-	0 - 3		0	
	This parameter is used to select the operating mode for the 0-10 V analogue output. The following options are possible: 0: NONE Analogue output disabled. 1: SPEED The analogue output is associated with motor speed regardless of direction of rotation. The voltage on the analogue output reaches its maximum value when the rotation speed is equal to the value set with parameter 35106: 2: CURRENT The analogue output is associated with current supplied to the motor regardless of direction of rotation. The value of the analogue output reaches its maximum when				

	the current drawn by the motor is equal to the current set with parameter 35106. 3: MB OUT The voltage on the analogue input is set with modbus register 24. The voltage on the analogue input is set to 0 V when modbus register 24 is set to 0. The voltage on the analogue input is set to 10V when modbus register 24 is set to 10000.

OUT MAX VALUE [rpm]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.9	35106	17	2	-	⏩
	Unit	Range		Default	
	RPM	1 - 20000		1000	
	As is true for the next menu, this menu is used to set parameter 35106, whose meaning depends on the value of parameter 35105. If parameter 35105 is set to 1, this menu is displayed, the analogue output is associated with motor speed, and parameter 35106 is the speed in RPM. The parameter is used to set the motor speed associated with the maximum value on the analogue input.				

OUT MAX VALUE [mA]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.10	35106	18	2	-	⏩
	Unit	Range		Default	
	mA	1 - 20000		1000	
	As was true for the previous menu, this menu is used to set parameter 35106, whose meaning depends on the value of parameter 35105. If parameter 35105 is set to 2, this menu is displayed, the analogue output is associated with current delivered to the motor, and parameter 35106 is the current in mA. The parameter is used to set the current associated with the maximum value on the analogue input.				

T1 IN LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.11	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 1. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				

T2 IN LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.12	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 2. 0: ACT HIGH High level on active digital input.				

	1: ACT LOW Low level on active digital input.				
T3 IN LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	
1.12.13	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 3. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
T4 IN LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.14	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 4. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
T5 IN LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.15	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 5. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
T6 IN LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.16	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 6. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
T7 IN LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.17	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 7. 0: ACT HIGH High level on active digital input.				

	1: ACT LOW Low level on active digital input.				
T_ENABLE_LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.18	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 8. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
V_ENABLE_LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.19	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 9. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
JOG CW LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.20	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 10. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
JOG CCW LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.21	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 11. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				
LIM SW CW LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.22	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital input 12. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				

LIM SW CCW LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
1.12.23	This parameter is used to set the logic level of digital input 13. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				

STROBE LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
1.12.24	This parameter is used to set the logic level of digital input 14. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				

HOME SW LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
1.12.25	This parameter is used to set the logic level of digital input 15. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				

DIRECTION LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35102 Note 1	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
1.12.26	This parameter is used to set the logic level of digital input 16. 0: ACT HIGH High level on active digital input. 1: ACT LOW Low level on active digital input.				

OUT 1 FUNCTION			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
	35158 Note 2	-	2	DM	⏩
	Unit	Range		Default	
	-	0 - 9		1	
1.12.27	This parameter is used to assign a specific function to digital output 1 according to the method described on **Table C.**				

OUT 2 FUNCTION			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type

1.12.28	35159 Note 2	-	2	DM	⏩
	Unit	Range		Default	
	-	0 - 9		4	
	This parameter is used to assign a specific function to digital output 2 according to the method described on **Table C.**				
OUT 3 FUNCTION			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.29	35160 Note 3	-	2	DM	⏩
	Unit	Range		Default	
	-	0 - 9		2	
	This parameter is used to assign a specific function to digital output 3 according to the method described on **Table C.**				
OUT 4 FUNCTION			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.30	35161 Note 2	-	2	DM	⏩
	Unit	Range		Default	
	-	0 - 9		7	
	This parameter is used to assign a specific function to digital output 4 according to the method described on **Table C.**				
OUT 5 FUNCTION			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.31	35162 Note 2	-	2	DM	⏩
	Unit	Range		Default	
	-	0 - 9		8	
	This parameter is used to assign a specific function to digital output 5 according to the method described on **Table C.**				
OUT 1 LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.32	23 Note 3	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital output 1. 0: ACT HIGH High level on output, if active. 1: ACT LOW Low level on output, if active.				
OUT 2 LEVEL			Miniaction 300	Miniaction 500	
Menu	Parameter	Display	Level	Condition	Type
1.12.33	23 Note 3	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital output 2. 0: ACT HIGH High level on output, if active.				

	1: ACT LOW Low level on output, if active.				
OUT 3 LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.34	23 Note 3	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital output 3. 0: ACT HIGH High level on output, if active. 1: ACT LOW Low level on output, if active.				
OUT 4 LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.35	23 Note 3	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital output 4. 0: ACT HIGH High level on output, if active. 1: ACT LOW Low level on output, if active.				
OUT 5 LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.12.36	23 Note 3	-	2	-	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to set the logic level of digital output 5. 0: ACT HIGH High level on output, if active. 1: ACT LOW Low level on output, if active.				

Note 1: Parameter 35102 consists of a 16 bit value. Each bet expresses the logic level of the associated digital input.
The least significant bit is associated with digital input 1. The most significant bit is associated with digital input 16. It can be accessed through modbus at address 35102.

Note 2: Parameters 35158 to 35162 are used to associate a specific function with each digital output on the drive. The possible options are described on **Table C** below.

Note 3: Parameter 23 consists of a 16 bit value. The five least significant bits express the logic level of the associated digital output.
The least significant bit is associated with digital output 1. The association continues until the fifth, which is associated with digital output 5.

9.11.15 MAIN MENU → PARAM → H-BRAKE

USE H BRAKE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.13.1	32966	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	This parameter is used to enable the control logic for the holding brake. 0: NO Holding brake control logic disabled. 1: YES Holding brake control logic enabled.				

H BRAKE LEVEL			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	
1.13.2	32971	-	2	D	⏩
	Unit	Range		Default	
	-	0 - 1		0	
	Used to set the logic level associated with the 24 V motor brake output. 0: ACT HIGH High level on output with brake released. 1: ACT LOW High level on output with brake released.				

H BRAKE MODE			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.13.3	32967	-	2	D	⏩
	Unit	Range		Default	
	-	0 – 1 – 2 – 3		2	
	Used to set the logic level associated with the 24 V motor brake output. 0: SERVICE Brake release controlled from the keyboard with parameter 32970. 1: MODBUS Brake release controlled with modbus register 32970. 2: ENABLE Brake is released when drive is enabled. 3: RPM Brake release depends on the speed of the electric field set when the current delivered to the motor is being controlled. See the description at the end of the table.				

REL DELAY [mS]			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.13.4	32968	-	2	-	⏩
	Unit	Range		Default	
	ms	0 - 10000		0	
	Used to set a delay on release of the holding brake.				

REL RPM			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.13.5	32969	25	2	-	⏩
	Unit	Range		Default	
	RPM	0 - 1000		0	

	This parameter is used to select the frequency of external brake release. See the description at the end of the table.				
LOCK RPM			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	
1.13.6	32978	25	2	-	⏩
	Unit	Range		Default	
	RPM	0 - 1000		0	
	This parameter is used to select the frequency of external brake engagement. See the description at the end of the table.				
RELEASE CURRENT			Miniaction 300		Miniaction 500
Menu	Parameter	Display	Level	Condition	Type
1.13.7	32979	25	2	-	⏩
	Unit	Range		Default	
	mA	0 – 8000		0	
	This parameter is used to set the minimum motor current for releasing the mechanical brake. See the description at the end of the table.				

The digital output for holding brake control on asynchronous motors can be managed according to the frequency of the voltage delivered when the current supplied to the motor is being controlled.
In this operating mode, after a start command is given, when the frequency of the voltage generated by the drive reaches the value corresponding to the motor speed in RPM set with parameter 32969, REL RPM, 1.13.5, the drive will check whether delivered current exceeds the value set with parameter 32979, RELEASE CURRENT ,1.13.7. If it does, the digital output that actuates the holding brake is enabled.
When the motor is stopped, the holding brake is actuated when the frequency of generated voltage falls below the value corresponding to the motor speed in RPM set with parameter 32978, LOCK RPM ,1.13.6.

9.12 Table A, Display rules	
Value	**Description: indicates the conditions necessary for enabling display**
2	The active controller, parameter 35166, must be different from modbus = 0.
3	The derive must be equipped with hardware for managing the external resistance used for dynamic braking.
4	Vector-type motor control, parameter 32944 = 0.
5	Position transducer used, parameter 32905 > 0.
7	NTC-type motor temperature sensor used to detect motor temperature.
10	A brushless sinusoidal emf motor is connected, parameter 32944 = 2.
11	The profile specifies a type of control other than torque control
12	The profile specifies torque control
13	Position transducer used, parameter 32905 > 0.
14	Incremental encoder used as the position transducer, parameter 32905 = 1.
15	Analogue voltage input active, 35136 = 0.
16	Analogue current input active, 35136 = 1.
17	Analogue output associated with motor speed, parameter 35105 = 1.
18	Analogue output associated with current supplied, parameter 35105 = 2.
20	Holding brake controlled from keyboard, parameter 32967 = 0.
21	Active controller: digital inputs, parameter 35166 = 2.
22	Asynchronous motor control active V/f with feedback
23	Synchronous motor control active with feedback from incremental encoder
24	Synchronous motor control active
25	Holding brake release according to electrical RPM, parameter 32967 = 3.

9.13 Table B, Conditions	
Value	**Description: indicates the conditions necessary for enabling display**
C	Action on the parameter in question must be requested by the active controller, which is set with parameter 35166. Example: The type of position feedback, parameter 32905, can be set by modbus only if modbus is the active controller.
D	Action on the parameter in question may be applied only if the drive is disabled. Example: The type of position feedback, parameter 32905, cannot be set if the drive is enabled.
CM	Action on the parameter in question by modbus may be applied only if modbus is the active controller. Modify by TTR01 is allowed regardless the active controller setting.
DM	Action on the parameter in question by modbus may be applied only if the drive is disabled. Modify by TTR01 is allowed regardless drive activation.

9.14 Table C, Functions that can be associated with digital outputs 1, 2, 3, 4, 5	
Value	**Wording**
	Description
0	NONE
	No function associated with digital output. The output remains deactivated.
1	FAULT
	The digital output signals a fault on the drive. When the drive is in the alarm mode, the output is activated and stays active until the fault condition is resolved.
2	I TIME
	The digital output is activated if the current delivered to the motor exceeds the threshold used by the motor protection system. This threshold is set to the smallest nominal current value (parameter 111) and the nominal current on the drive (parameter 112).
3	LIMIT SW
	The digital output is activated if at least one of the digital inputs associated with limit switches (inputs 12 and 13) is active.
4	ENABLED
	The digital output is active if the drive is enabled and ready to energise the motor.
5	CURRENT
	The digital output is activated when the current delivered to the motor is within the control window set by parameters **35144, 3514**5**.**
6	SPEED
	The digital output is activated when motor speed (detected if feedback is used, set if no feedback is used) is within the control window set by parameters **35146, 35147**.
7	POSITION
	The digital output is activated when the position of the motor differs from the target position by a value that is less than the one specified in parameter 35148 for a time exceeding that specified in parameter 35150.
8	HOMING
	The digital output is activated when the homing procedure concludes successfully.
9	MB OUT
	The level assumed by the digital output is set with modbus register 22 and depends on the value of the relative bit. The least significant bit in modbus register 22 is associated with digital output 1. These associations continue until the fifth bit from the right, which is associated with digital output 5. The other bits in the register are not significant.

10 COMMAND PROCEDURES

The drive offers the option of using certain command procedures to perform a sequence of operations for specific purposes. Command procedures can be requested by the user in two ways:

- Using the keyboard to access the relative menus.
- Requesting procedure execution by writing the appropriate modbus registers.

Command procedures are started by writing in the associated register a value within the range shown in the *"Parameter for invoking procedure"* field on the table below. The user view the status of execution of a procedure by reading the associated register.

The procedure is being executed as long as the value written with the procedure start command is read in the register associated with the procedure.

If the procedure was started from the keyboard, its status of execution is shown by the word

* WAIT * with animated asterisks.

The procedure has concluded with an error if a negative value is read in the register associated with the procedure.

If the procedure was started from the keyboard, its conclusion with an error is shown by the word FAILURE . To exit the display of the result of the procedure and resume navigation, press key ◄ .

The procedure has concluded correctly if a positive value is read in the register associated with the procedure.

If the procedure was started from the keyboard, the correct conclusion of the procedure is shown by the word DONE . To exit the display of the result of the procedure and resume navigation, press key ◄ .

PROCEDURES			
Modbus Register	**Programming menu**	**Parameter that invokes the procedure**	**Description**
99	1.5.2	1	Deletes errors. If the error persists when the procedure is concluded, an active error condition will be signalled
262	Note 1	1	Resets device parameters to factory defaults
35128	1.8.7	1 0	Calibrates motor position transducer Ends procedure if it is in progress
35129	1.9.8	1	Loads default profiles into RAM, profiles are not saved
32785	01/01/2020	1	Resets minimum and maximum values for measurements
32811	1.2.7	1	Deletes error list
32842	2	1	Saves all parameters in non-volatile memory
32843	3	1	Saves all parameters in non-volatile memory
32913	01/03/2017	0:2; Note 2 5000: 15000	Setting of PWM frequency.

35171	1.3.1	1 – Number of asynchronous motors	Changes active asynchronous motor
35172	1.4.1	1 – Number of synchronous motors	Changes active synchronous motor
32975	1.4.1	1: V/f control 2: Synchronous control	Changes active motor control

Note 1:

This procedure can be run from the keyboard by holding down keys 3 and 4 when the drive starts up.

Note 2:

The PWM frequency change procedure accepts any value from 5000 to 15000 Hz.

The actual programmed value is the one closest to the 3 possible values (5000, 10000, 15000).

PWM VALUES ALLOWED		
Index	**PWM frequency [Hz]**	**Maximum nominal current delivered [mA]**
0	5000	4200
1	10000	3800
2	15000	3400

Note that as PWM frequency is increased, the current that can be continuously supplied by the drive decreases to the values shown on the table.

11 ALARMS AND MESSAGES

11.1 LEDs

The front panel of the device has two LED indicators identified by L1 (located on the left) and L2 (located on the right). These indicators inform the user about the status of the drive, the power line and the operating condition of the device.

If an error occurs, the drive flashes L1 in a specific sequence that signals the code number associated with the error.
The error signalling sequence consists of a number of amber-coloured flashes made by LED L1 (corresponding to the tens in the error number), followed by of a number of green-coloured flashes (corresponding to the units in the error number).
The sequence begins with a pause that lasts longer than the duration of the individual flashes.
For example, if a motor overtemperature error occurs, the associated error code is 36 (from here on, this condition will be described as "the drive is in error 36"), so the sequence of flashes made by L1 consists of 3 amber-coloured flashes followed by 6 green-coloured flashes, and then a pause.
If a non-recoverable error has occurred, LED L2 will light up red, and the relative error number will be signalled with the appropriate signalling sequence on L1.
The following table shows the notifications that communicate the status of the drive.

STATUS OF DRIVE		**L1**	**L2**	**NOTES**
Correct operation	**Cannot be enabled** [1]	OFF	**GREEN** [2]	1: The drive cannot be enabled if DC bus voltage does not exceed 260 V. 2: If the drive is not in error, LED L2 briefly lights up GREEN and shuts off during modbus communication.
	Can be enabled	AMBER		
	Enabled	GREEN		
Drive in recoverable error		Error signalling sequence	OFF	The frequency of error signalling is 2 flashes per second.
Drive in non-recoverable error		Error signalling sequence	RED	The frequency of error signalling is 2 seconds for each flash.
Firmware updating		Flashing GREEN	RED	The signalling frequency of LED L1 is around 4 flashes per second.

If the drive detects an error during operation, it will be disabled, and an error notification will be sent using the LEDs on the device. If the keyboard is installed, an error notification screen will be temporarily shown, and the error number will be added to the list of recent errors.

If an error event occurs that can interrupt the normal execution internal processes, the drive sends a fatal error notification using LEDs L1 and L2. Unlike what happens in a normal error notification, LED L2 lights up steadily and is red during a fatal error notification.

Errors can be reset in the following ways:

- By deactivating the T_Enable input
- By starting command procedure 99 over the modbus or from TTR001 on menu 1.5.2

Errors are notified via modbus hierarchically according to the value of bits C1D and C2D in the status register with address 1.

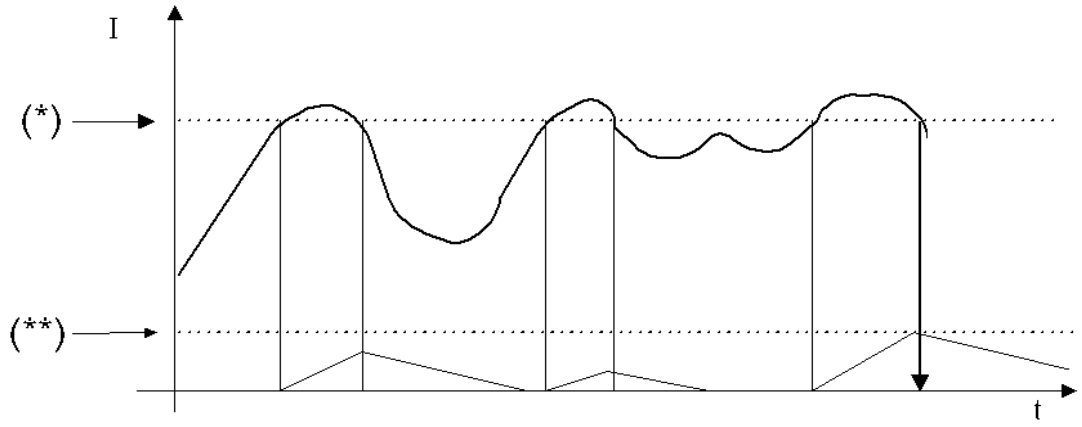
Bit C1D shows that an error has occurred. If bit C1D is set to recognize the error that has occurred, the contents of registers C1D (address 11) and C1D_2 (address 35000) must be read: their bits are associated with the various types of errors according to the masks described in the section on modbus registers . The most significant bit set to 1 shows that additional errors have occurred that are specified in their respective registers

C1D_MAN (address 129) and C1D_MAN _2 (address 35001).

Bit C2D shows that a warning has occurred. If bit C2D is set to recognize the warning that has occurred, the contents of registers C2D (address 12) and C2D_2 (address 35002) must be read: their bits are associated with the various types of warnings according to the masks described in the section on modbus registers . The most significant bit set to 1 shows that additional errors have occurred that are specified in their respective registers C2D_MAN (address 181) and C2D_MAN _2 (address 35003).

11.2 Alarm

INVERTER ERRORS			
Code no.	**Name**	**Associated bit**	**Description**
7	Drive temperature too high	C1D_DRIVER_TEMP_ERROR	Internal temperature in the drive is too high (parameter 203). Provide the drive with better ventilation.
9	Supplied current exceeds maximum limit	C1DMAN_IMAX_ERROR	The instantaneous current is higher than the lowest peak current for the motor (parameter 109) or the drive (parameter 110)
10	DC BUS voltage exceeds maximum limit	C1D_MAX_VBARRA	Mains voltage is too high, or the motor has caused an overvoltage condition beyond the allowed limit during deceleration.
11	Signals from position transducer	C1DMAN_ENCODER_ERROR	If the position sensor is the encoder type, an error is notified with a combination of hall signals, which is not permitted. If the position sensor is the resolver type, an error is notified if the amplitude of the analogue signals from the resolver is not plausible
14	DC BUS voltage is lower than minimum limit	C1D_MIN_VBARRA	Mains voltage is insufficient, or the motor is drawing too much current.
15	Corrupt data in EEPROM	C1DMAN_EEPROM_ERROR	This occurs when the EEPROM memory banks are damaged. If the memory is in good operating condition, the error can be recovered through interface TTR001 by re-initialising EEPROM with the default parameters.
16	Maximum speed exceeded	C1DMAN_VEL_ERROR	The speed detected by the drive exceeds the speed set with parameter 32954 (menu 1.4.5).
17	Internal communication error	C1DMAN_SCOM_ERROR	The device has detected a communication error in its internal modules.
18	Current time limit	C1D_I_ERROR	This error occurs when motor current

	exceeded		exceeds its maximum limit for a period that is longer than the time set with parameter 32771 (menu 1.3.8).
	This error occurs when motor current exceeds its maximum limit for a period that is longer than the time set with parameter 32771:  When the current level exceeds the calculated maximum (*), the time on a timer is increased. When the current level then falls below the maximum level, the time on the timer is decreased. If the time on the timer exceeds a preset value (**), an error is signalled. This is a safety function provided to the user for protecting the application.		
23	Overcurrent on hardware	C1D_OVERCURRENT_ERROR	The drive has detected that the hardware stage that checks for maximum supplied current has tripped.
24	Position error	C1D_EXCESSIVE_POS_DEV_ERROR	The position detected by the drive has diverged from the reference position by a distance whose absolute value exceeds the value programmed with parameter 35155 (menu 1.3.32).
27	PWM diagnostics	C1DMAN_HWDIAGPROBLEM_ERROR	The drive has been disabled because incorrect PWM control signals have been detected.
28	Input voltage 15 V	C1DMAN_15VOLTIPM_ERROR	The drive has detected an error in the value of the internally generated 15 V voltage.
31	D-brake piloting	C1DMAN_DIN_BRAKE_ERROR	Error on the pilot circuit for the external braking resistance
33	Slave configuration	C1D_2_WRITEAPPAR_ERROR	Error in configuration operations at start-up
34	Software overrun	C1D_2_OVER_TRAVEL_BIT	The position value has exceeded the range handled by the drive

35	Position management	C1D_2_POSITION_ERROR	General error associated with position management.
36	Motor temperature	C1D_2_MOTOR_TEMP_ERROR	Motor temperature is too high
37	Motor temperature sensor	C1D_2_TEMPPROBE_MOT_ERROR	Read error on motor temperature sensor
38	User-generated change in distance	C1D_2_QUOTE_CHANGED_ERROR	If a distance parameter is changed, it is checked to verify whether it is within permissible range. If the parameter is found to be out of range, it is automatically changed, and an error is generated to advise the user that at least one distance has been changed.
40	Digital output diagnostics	C1D_2_DIG_OUT_DIAG_ERROR	A protection system for the digital outputs has tripped
41	Failure of check for internal errors on slave	M_READ_SLAVE_ERRORCODE	The check for internal errors on the slave has failed
42	Internal communication error	C1D_2_MCOM_ERROR	The device has detected a communication error in its internal modules.
47	Corrupt data in EEPROM	C1D_2_EEPROM_ERROR	This occurs when the EEPROM memory banks are damaged. If the memory is in good operating condition, the error can be recovered through interface TTR001 by re-initialising EEPROM with the default parameters.

11.3 Warnings

The warnings on the device can be accessed only by reading the device status register in the modbus. They are generated to advise the user that a peculiar operating condition has occurred.

WARNINGS REGARDING THE DRIVE	
Bit	**Description**
C2DMAN_VEL_WARNING	Motor speed has deviated from the reference speed by a value, in absolute terms, that exceeds the speed warning threshold, parameter 32963 (menu 1.3.29)
C2D_EXCESSIVE_POS_DEV_WARNING	The current position has deviated from the reference position by a value, in absolute terms, that exceeds the position warning threshold set with parameter 35153 (menu 1.3.31)
C2DMAN__15VOLTIPM_WARNING	The internally generated 15 V voltage is lower than the minimum value
C2D_2_MOTOR_TEMP_WARNING	Motor temperature is approaching the error threshold. See the section on this subject for a description of the ways in which the error occurs
C2D_2_I_NOM_WARNING	The current supplied by the drive exceeds the protective threshold associated with error 18

12 SUMMARY OF MODBUS REGISTERS

12.1 SYSTEM REGISTERS

Address: **00000** **0x0000**

Name: Firmware version

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: 0xXXXX

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

This register contains the firmware version loaded into the device.

*****

Address: **00001** **0x0001**

Name: Status

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	x	x	x	x	x	x	x	x	Enable	C1D	C2D	Ready	x	x	x	x

Enable:	0	Drive disabled
	1	Drive enabled
Class 1 Diagnostic:	0	No error
	1	Error signalled on drive
Class 2 Diagnostic:	0	No error
	1	Warning signalled on drive
Ready	0	Drive cannot be enabled
	1	Drive can be enabled

*****

Address: **00020** **0x0014**

Name: Control word

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR DIR	-	-	-	-	-	-	-	-	RESET ERROR	DIG OUT ENABLE	V ENABLE	T ENABLE	MODE		

MOTOR DIR: 0 Rotation according to reference (modbus register 00021)
1 Rotation opposite from reference (modbus register 00021)

RESET ERROR: 0 No error reset command given
1 Error reset command given

DIG OUT ENABLE 0 Digital outputs controlled by modbus disabled
1 Digital outputs controlled by modbus enabled

V_ENABLE: 0 Reset speed control enable
1 Set speed control enable

T_ENABLE: 0 Reset torque control enable
1 Set torque control enable

MODE: 0 Torque control with max. speed:
- Register 00021 Torque reference
- Register 35116 Max. speed reference

1 Speed control
- Register 00021 Speed reference

2 Control with profile, selected with registers 00025 and 00026

3 Pulse-direction tracking control

*****

Address: **00021** **0x0015**

Name: Command word

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	COMMAND WORD															

This register contains the reference value (current or speed) used by the driver in the corresponding operating mode. Position control is obtained through the use of profiles.

*****

Address: **00022** **0x0016**

Name: Digital Out

Access: RW
Size: 1 WORD

Min: 0
Max: 65535
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	-	-	-	-	-	-	-	-	OUT5	OUT4	OUT3	OUT2	OUT1

OUT n: 0 Places output n at low logic level
1 Places output n at high logic level

If the digital outputs are set to be controlled remotely, they can be controlled according to the value set in this register, after the outputs are enabled (Bit 5, DIG OUT ENABLE, Control word 00020) The logic level (active high or active low) for each output can be modified using register 000023.

*****

Address: **00023** **0x0017**

Name: Digital Out Level

Access: RW
Size: 1 WORD

Min: 0
Max: 31
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	-	-	-	-	-	-	-	-	OUT 5 LEV	OUT 4 LEV	OUT 3 LEV	OUT 2 LEV	OUT 1 LEV

OUT n LEV: 0 Digital output n active at a high logic level
1 Digital output n active at a low logic level

The register is used to set the logic level (active high or active low) for each digital output.

*****

Address: **00024** **0x0018**

Name: Analogue out

Access: RW
Size: 1 WORD

Min: 0
Max: N/A
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ANALOGUE OUT															

This register contains the value in mV that will be assigned to the analogue output if it has been configured to perform this function.
Values exceeding 10000 are automatically assigned the value of 10000.

*****

Address: **00025** **0x19**

Name: Profile control

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	EXEC	RD	WR	-	-	-	-	-	MB PROF	PROFILE NUMBER						

EXEC 0 Interrupts execution of the profile selected with MB PROF and PROFILE NUMBER
EXEC 1 Executes the profile selected with MB PROF and PROFILE NUMBER

RD: 0 No profile read request is made
1 System is requested to read the profile selected with PROFILE NUMBER. The profile is read and copied in modbus profile 00026

RD: 0 No profile write request is made
1 System is requested to write the profile selected with PROFILE NUMBER. The modbus profile (register 00026) is copied in into the selected profile

MB PROF 0 If a profile execute command is given, the profile is executed that has been selected with PROFILE NUMBER.
If a profile execute command is given, the profile is executed that is contained

in the modbus buffer,

PROFILE NUMBER Selects the profile in RAM that is to be executed, read and written.

Requests for reading and writing that are made together with the execute command for a profile are ignored until the profile is executed.

If a request is made to execute a profile and EXEC = 1, If bit MB PROF is present, the modbus profile in register 000026 is executed.
If EXEC = 0, the profile selected with the PROFILE NUMBER is executed.

The read command copies the profile selected with the PROFILE NUMBER into the modbus bus, from address 00026.

The write command copies the contents of the buffer register into the profile selected with the PROFILE NUMBER.

The read and write operations act on copies of the profiles stored in RAM. To permanently save profiles, use the save command, which updates the entire set of profiles in non-volatile memory.

*****

Address: **00026** **0x002A**

Name: Modbus profile

Access: RW
Size: 8 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Default profile

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	PROFILE TYPE															
	PROFILE ACCELERATION															
	PROFILE SPEED															
	PROFILE DECELERATION															
	POSITION TARGET HIGH															
	POSITION TARGET LOW															
	P/D NUM RATIO															
	P/D DEN RATIO															

PROFILE TYPE

0	Homing
1	Speed
2	Absolute position
3	Relative position
4	Torque
5	Short run
6	Cw run
7	Ccw run
8	Pulse direction

PROFILE ACCELERATION	Contains the value (signed short) of acceleration time prescribed for the profile. If the profile specifies torque control, the content of this register determines the programmed current or slip.
PROFILE SPEED	Contains the value (signed short) of the speed prescribed for the profile.
PROFILE DECELERATION	Contains the value (signed short) of deceleration time prescribed for the profile.
POSITION TARGET HIGH POSITION TARGET LOW	These registers contain the position target
P/D NUM RATIO	Pulse direction tracking ratio, numerator (signed short)
P/D DEN RATIO	Pulse direction tracking ratio, denominator (signed short) The value is multiplied by 100 to make it a whole number.

This set of registers constitutes the modbus buffer for profile read and write operations. The profile in the buffer can be executed by selecting it with bit MB PROF in the profile control register, 00025.

12.2 DIAGNOSTICS REGISTERS

Address: **00011** **0x000B**

Name: C1D, Class 1 Diagnostic

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	X	-	-	X	X	-	X	X	X	-	-	-	-	-	X	-

This register contains notifications of diagnostic errors. Notifications implemented:

C1D_DRIVER_TEMP_ERROR	0x0002 Temperature on drive too high
C1D_I_ERROR	0x0080 Overcurrent time exceeded
C1D_MAX_VBARRA	0x0100 Max. voltage on DC bus
C1D_MIN_VBARRA	0x0100 Min. voltage on DC bus
C1D_EXCESSIVE_POS_DEV	0x0800 Excessive position deviation
C1D_OVERCURRENT_ERROR	0x1000 Max. current exceeded, hardware-based protection tripped
C1D_MAN_MASK	0x8000 Error in expansion word C1D_MAN

*****

Address: **00129** **0x0081**

Name: C1D_MAN, Class 1 Diagnostic Manufacturer

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	X	-	-	X		-	-	X	X	X	-	X	-	X	-	X

This register contains notifications of diagnostic errors defined by the manufacturer. Notifications implemented:

C1DMAN_SCOM_ERROR	0x0001 Internal communication error detected by slave
C1DMAN_VEL_ERROR	0x0004 Max. allowed speed exceeded
C1DMAN_HALL_ERROR	0x0010 Error in hall sensor signals
C1DMAN_DIAG_ERROR	0x0040 Diagnostic error
C1DMAN_EEPROM_ERROR	0x0080 EEPROM error
C1DMAN_IMAX_ERROR	0x0100 Max. instantaneous current exceeded
C1DMAN_HWDIAGPROBLEM	0x0800 Hardware-based diagnostics
C1DMAN_15VOLTIPM_ERROR	0x1000 Error on 15 V input power
C1DMAN_DIN_BRAKE_ERROR	0x8000 Dynamic brake circuitry

*****

Address: **35000** **0x88B8**

Name: C1D_2, Class 1 Diagnostic 2

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	X	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X

This register contains notifications of diagnostic errors. Notifications implemented:

C1D_2_WRITEAPPAR_ERROR	0x0001 Internal initialisation error
C1D_2_OVER_TRAVEL_BIT	0x0002 Internal position overflow
C1D_2_POSITION_ERROR	0x0004 General position error
C1D_2_MOTOR_TEMP_ERROR	0x0008 Motor temperature too high
C1D_2_TEMPPROBE_MOT	0x0010 Motor temperature sensor error
C1D_2_PO_TO_ZERO_ERROR	0x0020 Position reference zeroed after a change in the conversion ratio into the unit desired by the user – encoder or resolver pulses
C1D_2_MODBUS_TIMEOUT	0x0040 Timeout on
C1D_2_EEPROM_ERROR	0x0080 EEPROM error
C1D_2_DIG_OUT_DIAG	0x0100 Digital output diagnostics
C1D_2_READ_SLVERR_CODE	0x0200 Error on slave error control
C1D_2_MCOM_ERROR	0x0400 Intern communication error detected by master
C1D_2_MAN_MASK	0x8000 Error in expansion word C1D_MAN_2

*****

Address: **35001** **0x88B9**

Name: C1D_MAN_2 , Class 1 Diagnostic Manufacturer 2

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

This register contains notifications of diagnostic errors defined by the manufacturer. No active bit.

*****

Address: **00012** **0x000C**

Name: C2D, Class 2 Diagnostic

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-

This register contains notifications of warnings. Notifications implemented:

C2D_EXCESSIVE_POS_DEV 0x0800 Excessive position deviation
C2D_MAN_MASK 0x8000 Warning in expansion word C2D_MAN

*****

Address: **00181** **0x00B5**

Name: C2D_MAN, Class 2 Diagnostic Manufacturer

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-

This register contains notifications of warnings defined by the manufacturer. Notifications implemented:

C2DMAN_VEL_WARNING 0x0004 Speed deviation too high
C2DMAN__15VOLTIPM_WARNING 0x1000 Warning on internal 15 V power

*****

Address: **35002** **0x88BA**

Name: C2D_2, Class 2 Diagnostic 2

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X

This register contains notifications of type-2 warnings. Masks implemented:

C2D_2_MOTOR_TEMP_WARNING 0x0001 Motor temperature too high
C2D_2_I_NOM_WARNING 0x0002 Overcurrent time threshold exceeded
C2D_2_MAN_MASK 0x8000 Warning in expansion word C2D_MAN_2

*****

Address: **35003** **0x88BB**

Name: C2D_MAN_2 , Class 2 Diagnostic Manufacturer 2

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

This register contains notifications of type-2 warnings. No mask defined

12.3 MEASUREMENT REGISTERS

Address: **00040** **0x0028**

Name: Speed feedback

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED FEEDBACK															

This register contains the speed feedback value in RPM.

*****

Address: **00051** **0x0033**

Name: Position feedback

Access: RO
Size: 2 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION FEEDBACK															

This register contains the position feedback value.

*****

Address: **00084** **0x0054**

Name: Current feedback

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	CURRENT FEEDBACK															

This register contains the current feedback value.

*****

Address: **00380** **0x017C**

Name: VDC bus measured

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	V BUS DC															

This register contains the measured value of DC bus voltage, in volts.

*****

Address: **00383** **0x017F**

Name: Motor temperature

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR TEMPERATURE															

This register contains the measured motor temperature. It is expressed in °C.

*****

Address: **00384** **0x0180**

Name: Drive temperature

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DRIVE TEMPERATURE															

This register contains the measured temperature of the power module in the drive. Measurement is in °C.

*****

Address: **32784** **0x8010**

Name: DC Bus min

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DC BUS MIN															

This register contains the measured minimum value of DC bus voltage when drive is enabled. Measurement is in volts.
If the drive has never been enabled, it contains the value of -1, which shows that this measurement has never been made. In this case, the display shows 0 volts.

*****

Address: **32800** **0x8016**

Name: DC Bus max

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DC BUS MAX															

This register contains the measured maximum value of DC bus voltage when drive is enabled. Measurement is in volts.

*****

Address: **32890** **0x807A**

Name: I RMS max measure

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	I RMS MAX MEASURE															

This register contains the maximum measured value of RMS current supplied. Measurement is in mA.

*****

Address: **32901** **0x8085**

Name: I Peak max measure

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	I PEAK MAX MEASURE															

This register contains the value of the maximum peak current supplied. Measurement is in mA.

*****

Address: **32902** **0x8086**

Name: Motor temperature

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: 0

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR TEMPERATURE															

This register contains the maximum motor temperature value measured. It is expressed in °C.

*****

Address: **32903** **0x8085**

Name: Drive temperature max

Access: RO

Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DRIVE TEMPERATURE MAX															

This register contains the max. measured temperature value for the power module in the drive. Measurement is in °C.

*****

Address: **32926** **0x809E**

Name: Max speed

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MAX SPEED															

This register contains the maximum speed value measured for the drive. Measurement is in RPM.

*****

Address: **32951** **0x80B7**

Name: Electrical frequency output

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ELECTRICAL FREQUENCY OUTPUT															

This register contains the frequency value of generated voltage.
Measurement is in tenths of a Hz.

*****

Address: **32952** **0x80B8**

Name: Maximum electrical frequency output

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MAXIMUM ELECTRICAL FREQUENCY OUTPUT															

This register contains the max. frequency value of generated voltage.
Measurement is in tenths of a Hz.

*****

Address: **32958** **0x80BE**

Name: Motor voltage out

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR VOLTAGE OUT															

This register contains the measured value for generated voltage.
Measurement is in volts.

*****

Address: **32976** **0x80D0**

Name: Applied slip

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	APPLIED SLIP															

This register contains the value of applied slip. The value is significant when active feedback control is applied to an asynchronous motor.
It is expressed in RPM.

*****

Address: 32977 0x80D1

Name: Applied slip max

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	APPLIED SLIP MAX															

This register contains the value of maximum applied slip. The value is significant when active feedback control is applied to an asynchronous motor.
It is expressed in RPM.

*****

Address: **35005 0x88BD**

Name: Digital inputs

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	IN16	IN15	IN14	IN13	IN12	IN11	IN10	IN9	IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1

This register contains the value of the digital inputs in accordance with the logic level assigned with register 35102

*****

Address: **35006 0x88BE**

Name: Analogue inputs 0-10 volt

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ANALOGUE INPUT 0-10 VOLT															

This register contains the value of the voltage measured on the 0-10 V analogue input.
Measurement is in uV.

*****

Address: **35007** **0x88BF**

Name: Analogue inputs 4 - 20 mA

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ANALOGUE INPUT 4-20 uA															

This register contains the value of the current measured on the 4 - 20 mA. analogue input.
Measurement is in uA.

*****

Address: **35130** **0x893A**

Name: User position feedback

Access: RO
Size: 2 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: 0x00000000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION AMPLIFIED HIGH															
	POSITION AMPLIFIED LOW															

This register contains the amplified current position value expressed in the unit programmed by the user.

POSITION AMPLIFIED Current position value amplified by the amplification factor

The amplification factor is contained in modbus register 35132: the AMPLIFIER FACTOR parameter.
It is a long-signed type.

*****

Address: **35132** **0x893C**

Name: User position amplification

Access: RO
Size: 2 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AMPLIFIER FACTOR HIGH															
	AMPLIFIER FACTOR LOW															

This register contains the amplification factor for determining the position in the user-selected unit.

AMPLIFIER FACTOR — The amplification factor by which the position value is amplified.
It is a long-unsigned type.

*****

Address: **35134** **0x893E**

Name: Movement flags

Access: RO
Size: 1 WORD

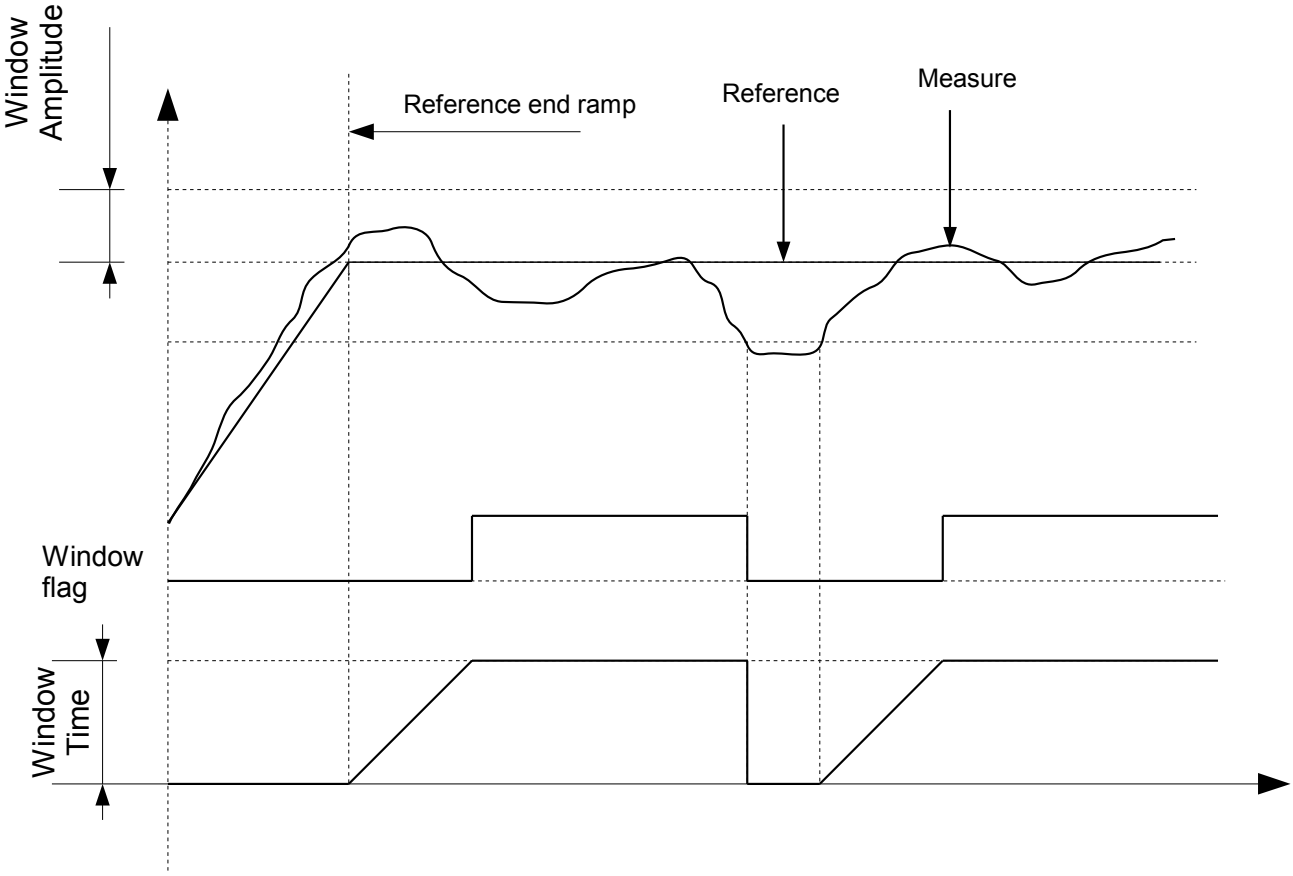
Min: N/A
Max: N/A
Meas: N/A

Reset: 0x0000

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	-	-	-	-	-	-	-	-	-	PROFILE ENDED	POSITION WINDOW OK	VELOCITY WINDOW OK	CURRENT WINDOW OK	END HOMING PROCEDURES	END POSITION RAMP	END SPEED RAMP

END SPEED RAMP 0x0001 End of speed ramp (Reference)
END POSITION RAMP 0x0002 End of position profile (Reference)
END HOMING PROCEDURE 0x0004 End of homing procedure
CURRENT WINDOW OK 0x0008 Current in desired window for at least the programmed time
VELOCITY WINDOW OK 0x0010 Speed in desired window for at least the programmed time
POSITION WINDOW OK 0x0020 Position in desired window for at least the programmed time
PROFILE ENDED 0x0040 Profile has ended

The CURRENT WINDOW OK, VELOCITY WINDOW OK, POSITION WINDOW OK flags are generated according to the following logic:



The parameters for the amplitude values for the relative windows and the minimum wait time are set using the modbus registers at addresses beginning with 35140.

12.4 PARAMETERS

Address: **00100** **0x0064**

Name: KP velocity

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	KP VELOCITY															

This register sets the proportional gain for the speed loop.
The value is in tens of uA / RPM. The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 100.

*****

Address: **00101** **0x0065**

Name: KI velocity

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	KI VELOCITY															

This register sets the additional gain for the speed loop.
The value is in hundreds of uA / (RPM*second). The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 10.

*****

Address: **00104** **0x0068**

Name: KP position

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	KP POSITION															

This register sets the proportional gain for the position loop.
The value is in tenths of an rpm / revolution of motor shaft. The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 100.

*****

Address: **00106** **0x006A**

Name: KP current

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	KP CURRENT															

This register sets the proportional gain for the current loop.
The value is in tens of mV / A. The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 100.

*****

Address: **00107** **0x006B**

Name: KI current

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	KI CURRENT															

This register sets the additional gain for the current loop.
The value is in tens of V / (A*second) The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 100.

*****

Address: **00109** **0x006D**

Name: Motor peak current

Access: RW
Size: 1 WORD

Min: N/A

Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR PEAK CURRENT															

This register sets peak motor current. Measurement is in mA.

*****

Address: **00110** **0x006E**

Name: Drive peak current

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DRIVE PEAK CURRENT															

This register contains the value for peak drive current. Measurement is in mA.

*****

Address: **00111** **0x006F**

Name: Motor rated current

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR RATED CURRENT															

This register sets the nominal motor current. Measurement is in mA.

*****

Address: **00112** **0x0070**

Name: Drive rated current

Access: RO
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DRIVE RATED CURRENT															

This register contains the value for nominal drive current. Measurement is in mA.

*****

Address: **32769** **0x8001**

Name: KD position

Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	KD POSITION															

This register sets the derived gain for the position loop.
The value is in (tenths of an rpm * second) / revolution of motor shaft. The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 10.

*****

Address: **32771** **0x8003**

Name: I limit max time

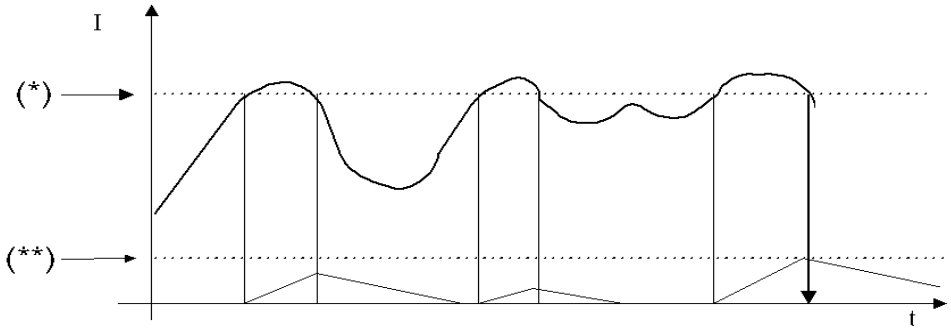
Access: RW
Size: 1 WORD

Min: N/A
Max: N/A
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	I LIMIT MAX TIME															

This register sets the maximum time that the current threshold can be exceeded.



When the current exceeds the calculated maximum (** the lesser value between parameters 111 and 112), the time on a timer is increased. When the current level then falls below the maximum level, the time on the timer is decreased. If the time on the timer exceeds a preset value (** = parameter 32771), an error is signalled. This is a safety function provided to the user for protecting the application.
The associated flag is C1D_I_ERROR.

*****

Address: **32827** **0x803B**

Name: External brake active

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	EXT BRAKE ACTIVE															

EXT BRAKE ACTIVE 0 External braking resistance disabled
1 External braking resistance enabled

*****

Address: **32828** **0x803C**

Name: External brake resistance

Access: RW
Size: 1 WORD

Min: 30
Max: 500
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	EXT BRAKE RESISTANCE															

This register sets the resistance in ohms for the external brake resistance.

*****

Address: **32831** **0x803F**

Name: External brake power

Access: RW
Size: 1 WORD

Min: 1
Max: 20000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	EXT BRAKE POWER															

This register sets the maximum power that can be dissipated by the external brake resistance. Measurement is in watts.

*****

Address: **32904** **0x8088**

Name: Feedback direction

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	FEEDBACK DIRECTION															

FEEDBACK DIRECTION	0	Toward positive anti-clockwise.
	1	Toward positive clockwise.

This register sets the positive direction of rotation of the position feedback sensor, whether it its type is resolver or incremental encoder.

*****

Address: **32905** **0x8089**

Name: Feedback type

Access: RW
Size: 1 WORD

Min: 0
Max: 2

Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	FEEDBACK TYPE															

FEEDBACK TYPE
0: No transducer installed, option not applicable.
1: Incremental encoder
2: Resolver

This register sets the type of position feedback sensor installed on the motor.

*****

Address: **32908** **0x808C**

Name: Vrms min boost

Access: RW
Size: 1 WORD

Min: 0
Max: 100
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	VRMS MIN BOOST															

This register sets the minimum boost voltage. See description V/f profile.

*****

Address: **32909** **0x808D**

Name: Vrms nom boost

Access: RW
Size: 1 WORD

Min: 100
Max: 350
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	VRMS NOM BOOST															

This register sets the nominal boost voltage. See description V/f profile.

*****

Address: **32910** **0x808E**

Name: Freq min boost

Access: RW
Size: 1 WORD

Min: 0
Max: 128
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	FREQ MIN BOOST															

This register sets the minimum boost frequency. See description V/f profile.

*****

Address: **32911** **0x808F**

Name: Freq nom boost

Access: RW
Size: 1 WORD

Min: 0
Max: 128
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	FREQ NOM BOOST															

This register sets the nominal boost frequency. See description V/f profile.

*****

Address: **32914** **0x8092**

Name: Encoder resolution

Access: RW
Size: 1 WORD

Min: 1
Max: 65536
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ENCODER RESOLUTION															

This register sets the resolution of the encoder. Expressed in pulses/revolution.

Address: **32918** **0x8096**

Name: Dc brake time

Access: RW
Size: 1 WORD

Min: 0
Max: 4000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DC BRAKE TIME															

This register sets the duration of DC braking when an asynchronous motor is stopped.
Measurement is in ms.

*****

Address: **32944** **0x80B0**

Name: Active motor control

Access: RO
Size: 1 WORD

Min: 1
Max: 2
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ACTIVE MOTOR CONTROL															

This register is used to read active motor control data.

ACTIVE MOTOR CONTROL	0	Active V/f control of asynchronous motor
	1	Vector control of synchronous motor active.

*****

Address: **32953** **0x80B9**

Name: Pair pole number

Access: RW
Size: 1 WORD

Min: 0
Max: 4
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	PAIR POLE NUMBER															

This register sets the number of polar pairs on the motor.

*****

Address: **32954** **0x80BA**

Name: Max speed

Access: RW
Size: 1 WORD

Min: 0
Max: 8000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MAX SPEED															

This register sets the threshold for maximum allowed speed. If the drive measures a higher speed, a C1DMAN_VEL_ERROR is signalled.

*****

Address: **32955** **0x80BB**

Name: Motor cable direction

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR CABLE DIRECTION															

This register contains the direction of rotation imposed by the power wiring on the motor, as detected during calibration of the position transducer.

*****

Address: **32956** **0x80BC**

Name: Hall direction

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HALL DIRECTION															

This register contains the direction of rotation created by the signal sequence of the hall transducers as detected during calibration of the motor position transducer.

*****

Address: **32957** **0x80BD**

Name: Phase value

Access: RW
Size: 1 WORD

Min: 0
Max: 65535
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	PHASE VALUE															

This register contains the phase offset between electric angle and position transducer for the motor. The value is automatically detected during calibration of the motor position transducer.

*****

Address: **32958** **0x80BE**

Name: V rms uot (phase to phase)

Access: RO
Size: 1 WORD

Min: 0
Max: N/A
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	V RMS OUT															

This register contains the value for RMS voltage supplied to the motor. It is not a measurement

*****

Address: **32959** **0x80BF**

Name: Asi speed min

Access: RW
Size: 1 WORD

Min: 0
Max: 6000

Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ASI SPEED MIN															

This register sets the minimum speed of an asynchronous motor.

*****

Address: **32960** **0x80C0**

Name: Asi speed max

Access: RW
Size: 1 WORD

Min: 0
Max: 6000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ASI SPEED MAX															

This register sets the maximum speed of an asynchronous motor.

*****

Address: **32961** **0x80C1**

Name: Motor direction

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR DIRECTION															

MOTOR DIRECTION 0: Rotation is clockwise with a positive speed or torque reference.
1: Rotation is anti-clockwise with a positive speed or torque reference.

This register is used to set the direction of motor rotation.

*****

Address: **32963** **0x80C3**

Name: Speed warning

Access: RW
Size: 1 WORD

Min: 0
Max: 6000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED WARNING															

If speed control is applied to the motor, and measured speed differs from programmed speed by a value exceeding the SPEED WARNING, a speed warning is generated.
The warning is signalled by a dedicated bit in C2DMan.
The warning is disabled by setting the SPEED WARNING value to 0 (default).

*****

Address: **32964** **0x80C4**

Name: Speed error

Access: RW
Size: 1 WORD

Min: 0
Max: 6000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED ERROR															

If speed control is applied to the motor, and measured speed differs from programmed speed by a value exceeding the SPEED ERROR, a speed error is generated.
The error is signalled by a dedicated bit in C1DMan.
The warning is disabled by setting the SPEED ERROR value to 0 (default).

*****

Address: **32965** **0x80C5**

Name: Feedback calibration

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	FEEDBACK CALIBRATION															

Shows and/or sets the calibration status of the position sensor.
1 shows that the position sensor has been calibrated. 0 shows that it has not been calibrated.

*****

Address: **32966** **0x80C6**

Name: Use holding brake

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	USE HOLDING BRAKE															

This parameter is used to enable the control output for the holding brake.

0 Holding brake output disabled
1 Holding brake output enabled

*****

Address: **32967** **0x80C7**

Name: Use holding mode

Access: RW
Size: 1 WORD

Min: 0
Max: 2
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOLDING BRAKE MODE															

This parameter is used to select the operating mode for the holding brake.

0 SERVICE Brake is locally engaged using the SERVICE menu
1 MODBUS Brake is engaged over the modbus by writing register 32970
2 ENABLE Brake is engaged when the drive is enabled
3 RPM Brake engaging depends on the speed of the electric field set in the current control operating mode

*****

Address: **32968** **0x80C8**

Name: Holding brake release time

Access: RW
Size: 1 WORD

Min: 0
Max: 10000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOLDING BRAKE RELEASE TIME															

Used to set a delay on the release of the holding brake, only.
Measurement is in ms.

*****

Address: **32969** **0x80C9**

Name: Release rpm

Access: RW
Size: 1 WORD

Min: 0
Max: 1000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	RELEASE RPM															

This register sets the holding brake release speed.
It is expressed in RPM.

*****

Address: **32970** **0x80CA**

Name: Holding brake command

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOLDING BRAKE COMMAND															

This register is used to activate the holding brake. The value of this register can be changed if the drive is locally controlled, the holding brake is controlled from the service menu, and the dedicated item on the service menu is used to change the activation status of the brake.

0 Holding brake control output disabled.
1 Holding brake control output enabled.

*****

Address: **32971** **0x80CB**

Name: Holding brake logic level

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOLDING BRAKE LOGIC LEVEL															

This parameter is used to set the logic level of the stationary brake control output.

0 Holding brake control output active with high logic level.
1 Holding brake control output active with low logic level.

Address: **32972** **0x80CC**

Name: Pwm frequency

Access: RO
Size: 1 WORD

Min: 0
Max: 15000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	PWM VALUE															

This register is used to read the frequency of the PWM used by the drive. The PWM value can be changed by the user with procedure 32913.

*****

Address: **32973** **0x80CD**

Name: DC brake voltage

Access: RW
Size: 1 WORD

Min: 0
Max: 120
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DC BRAKE VOLTAGE															

This register sets the DC voltage supplied to the motor during braking in order to stop an asynchronous motor.
Measurement is in volts.

*****

Address: **32974** **0x80CE**

Name: Max slip

Access: RW
Size: 1 WORD

Min: 10
Max: 3000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MAX SLIP															

This register sets the maximum slip applied to the motor if it is asynchronous and feedback is applied. It is expressed in RPM.

*****

Address: **32978** **0x80D2**

Name: Lock rpm

Access: RW
Size: 1 WORD

Min: 0
Max: 1000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	LOCK RPM															

This register sets the holding brake lock speed.
It is expressed in RPM.

*****

Address: **32979** **0x80D3**

Name: Release current

Access: RW
Size: 1 WORD

Min: 0
Max: 8000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	RELEASE CURRENT															

This register sets the current threshold for holding brake release.
Measurement is in mA.

*****

Address: **35100** **0x891C**

Name: Temperature probe type

Access: RW
Size: 1 WORD

Min: 0
Max: 3
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	TEMPERATURE PROBE TYPE															

This register sets the type of temperature sensor installed on the motor:

TEMPERATURE PROBE TYPE>	0	None
	1	NTC type Epcos B57227K
	2	N.C. trip device
	3	PTC

Address: **35101** **0x891D**

Name: Motor shut down temperature

Access: RW
Size: 1 WORD

Min: 0
Max: 155
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR SHUT DOWN TEMPERATURE															

This register sets the maximum temperature limit for motor operation.

*****

Address: **35102** **0x891E**

Name: Digital inputs logic level

Access: RW
Size: 1 WORD

Min: 0
Max: 65535
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	LGC LEV 16	LGC LEV 15	LGC LEV 14	LGC LEV 13	LGC LEV 12	LGC LEV 11	LGC LEV 10	LGC LEV 9	LGC LEV 8	LGC LEV 7	LGC LEV 6	LGC LEV 5	LGC LEV 4	LGC LEV 3	LGC LEV 2	LGC LEV 1

LGC LEV no. 0 High logic level on active input no.
1 Low logic level on active input no.

This register sets the logic level of the digital inputs.

*****

Address: **35105** **0x8921**

Name: Analogue out source

Access: RW
Size: 1 WORD

Min: 0
Max: 3
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ANALOGUE OUT SOURCE															

ANALOGUE OUT SOURCE; 0 NONE
1 SPEED
2 TORQUE
3 MB OUT

This register sets the source associated with the analogue output.

*****

Address: **35106** **0x8922**

Name: Analogue out max value

Access: RW
Size: 1 WORD

Min: 1

Max: 20000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ANALOGUE OUT MAX VALUE															

This register sets the value of the measurement that controls the analogue output associated with the maximum value that can be assumed by the output (10 V).

This parameter is meaningful only if the analogue output is associated with supplied current or rotation speed.

If the analogue output is controlled remotely over the modbus bus, the value of this register is irrelevant.

*****

Address: **35107** **0x8923**

Name: Acceleration time

Access: RW
Size: 1 WORD

Min: 5
Max: 10000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ACCELERATION TIME															

This register sets the acceleration time.

*****

Address: **35108** **0x8924**

Name: Deceleration time

Access: RW
Size: 1 WORD

Min: 5
Max: 10000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DECELERATION TIME															

This register sets the deceleration time.

*****

Address: **35109** **0x8925**

Name: Jog speed

Access: RW
Size: 1 WORD

Min: 1
Max: 6000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	JOG SPEED															

This register sets the jog speed.

*****

Address: **35111** **0x8927**

Name: Maximum speed

Access: RW
Size: 1 WORD

Min: 1
Max: 6000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MAXIMUM SPEED															

This register sets the maximum speed.

*****

Address: **35114** **0x892A**

Name: Jog ramps time

Access: RW
Size: 1 WORD

Min: 5
Max: 10000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	JOG RAMPS TIME															

This register sets the acceleration and deceleration times for the ramps if jog operation is currently selected

*****

Address: **35115** **0x892B**

Name: Position ratio numerator

Access: RW
Size: 2 WORD

Min: 1
Max: 2147483647
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION RATIO NUMERATOR HIGH															
	POSITION RATIO NUMERATOR LOW															

This pair of registers sets the numerator of the conversion ratio between internal position unit and user-selected position unit.

*****

Address: **35117** **0x892D**

Name: Position ratio denumerator

Access: RW
Size: 2 WORD

Min: 1
Max: 2147483647
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION RATIO DENOMINATOR HIGH															
	POSITION RATIO DENOMINATOR LOW															

This pair of registers set the denominator of the conversion ratio between internal position unit and user-selected position unit.

*****

Address: **35119** **0x892F**

Name: P/D num ratio

Access: RW
Size: 1 WORD

Min: -32768
Max: 32767
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	P/D NUM RATIO															

This parameter is the numerator of the ratio between the internal position resolution of 65536 steps/revolution and the number of command pulses associated with a revolution made by the motor.

*****

Address: **35120** **0x8930**

Name: P/D den ratio

Access: RW
Size: 1 WORD

Min: 1
Max: 65535
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	P/D DEN RATIO															

This parameter is the denominator of the ratio between the internal position resolution of 65536 steps/revolution and the number of command pulses associated with a revolution made by the motor.
The number entered with the keyboard into this register using the modbus interface is automatically multiplied by 100.

*****

Address: **35121** **0x8931**

Name: Synchronous motor table index

Access: RO
Size: 1 WORD

Min: 0
Max: Number of motors implemented in firmware.
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SYNCHRONOUS MOTOR TABLE INDEX															

This register is used to reveal which motor has been selected from the set to predefined motors. The motor is selected with dedicated procedure 35172. If 0 is read, no motor has been selected. The parameters of the selected motor are overwritten in the volatile memory of the drive. To permanently store the selection, the set of parameters must be saved with the save command.

*****

Address: **35122** **0x8932**

Name: Home switch speed

Access: RW

Size: 1 WORD

Min: 1
Max: 6000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOME SWITCH SPEED															

This register is used to set the speed maintained by the drive during the search for the switches involved in the homing procedure in progress.

*****

Address: **35123** **0x8933**

Name: Home zero speed

Access: RW
Size: 1 WORD

Min: 1
Max: 6000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOME ZERO SPEED															

This register is used to set the speed maintained by the drive during the search for the positioning signal sent by the angular position transducer in those homing procedures that prescribe this operating method.

*****

Address: **35124** **0x8934**

Name: Home ramps time

Access: RW
Size: 1 WORD

Min: 5
Max: 10000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOME RAMPS TIME															

This register is used to set the accelerations and decelerations that occur during the homing procedure.

*****

Address: **35125** **0x8935**

Name: Home position offset

Access: RW
Size: 2 WORD

Min: Depends on the conversion ratio between the internal position unit and the user-selected position unit
Max: Depends on the conversion ratio between the internal position unit and the user-selected position unit
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOME POSITION HOFFSET HIGH															
	HOME POSITION HOFFSET LOW															

This register is used to set the position offset assigned at the end of the homing procedure.
It is expressed in the amplified user-selected unit.

*****

Address: **35135** **0x893F**

Name: Homing type

Access: RW
Size: 1 WORD

Min: 1
Max: 35
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	HOMING TYPE															

This register is used to set the type of homing to be carried out.

*****

Address: **35136** **0x8940**

Name: Analogue input selected

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN SELECTED															

AN IN SELECTED 0 The analogue reference is the 0-10 V input

AN IN SELECTED 1 The analogue reference is the 4-10 mA input

*****

Address: **35137** **0x8941**

Name: Analogue input offset 0 - 10

Access: RW
Size: 1 WORD

Min: 0
Max: 9000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN OFFSET 0 - 10															

This register contains the value of the offset that must be subtracted from the 0-10 V analogue input. Measurement is in mV.

*****

Address: **35138** **0x8942**

Name: Analogue input offset 4 - 20

Access: RW
Size: 1 WORD

Min: 4000
Max: 19000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN OFFSET 4 - 20															

This register contains the value of the offset that must be subtracted from the 4-20 mA analogue input. Measurement is in uA.

*****

Address: **35139** **0x8943**

Name: Analogue input max speed ref

Access: RW
Size: 1 WORD

Min: 0
Max: 6000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN MAX SPEED REF															

This register contains the speed value associated with the maximum value of the analogue input.
It is expressed in RPM.

*****

Address: **35140** **0x8944**

Name: Analogue input min speed ref

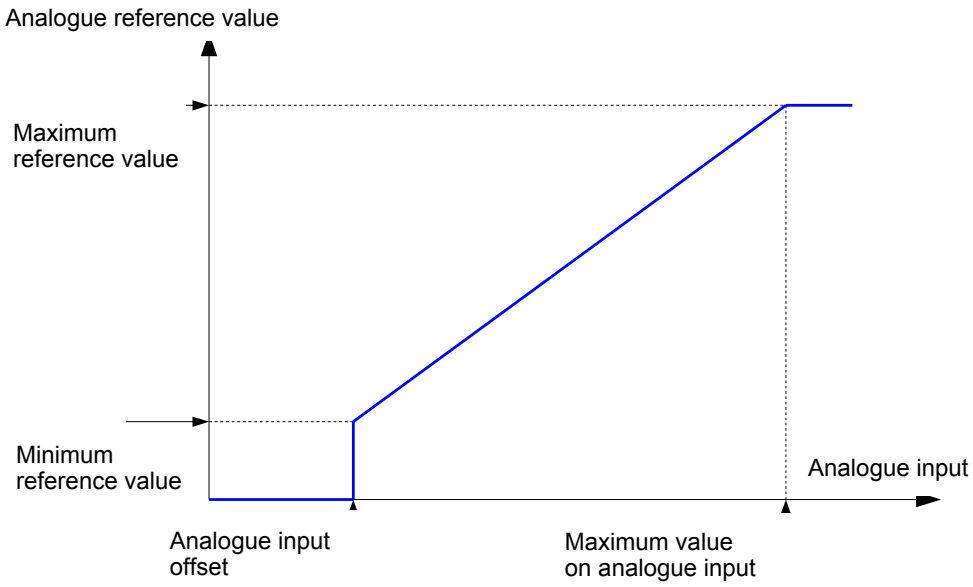
Access: RW
Size: 1 WORD

Min: 0
Max: 6000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN MIN SPEED REF															

This register contains the speed value associated with the minimum value of the analogue input.
It is expressed in RPM.



Address: **35141** **0x8945**

Name: Analogue input max current reference

Access: RW
Size: 1 WORD

Min: 0
Max: 65535
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN MAX CURRENT REF															

This register contains the current value associated with the maximum value of the analogue input.
Measurement is in mA.

*****

Address: **35142** **0x8946**

Name: Analogue input min current reference

Access: RW
Size: 1 WORD

Min: 0
Max: 65535
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AN IN MIN CURRENT REF															

This register contains the current value associated with the minimum value of the analogue input.
Measurement is in mA.

*****

Address: **35143** **0x8947**

Name: Modbus no local enable

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MB NO LOC ENABLE															

This register is used to exclude local enabling signals (V enable and V enable) when Modbus is the active controller.

MB NO LOC ENABLE	0	Enabling inputs are active
MB NO LOC ENABLE	1	Enabling inputs are inactive

*****

Address: **35144** **0x8948**

Name: Current window

Access: RW
Size: 1 WORD

Min: 1
Max: 10000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	CURRENT WINDOW															

This register is used for setting the value of the current window to generate the CURRENT WINDOW OK signal in modbus movement flags register 35134.
Measurement is in mA.

*****

Address: **35145** **0x8949**

Name: Current window time

Access: RW
Size: 1 WORD

Min: 1
Max: 65000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	CURRENT WINDOW TIME															

This register is used to set the minimum wait time in the current window for generating the CURRENT WINDOW OK signal in modbus movement flags register 35134.
Measurement is in ms.

*****

Address: **35146** **0x894A**

Name: Speed window

Access: RW
Size: 1 WORD

Min: 1
Max: 1000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED WINDOW															

This register is used for setting the value of the speed window for generating the SPEED WINDOW OK signal in modbus movement flags register 35134.
Measurement is in RPM.

*****

Address: **35147** **0x894B**

Name: Speed window time

Access: RW
Size: 1 WORD

Min: 1
Max: 65000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED WINDOW TIME															

This register is used to set the minimum wait time in the speed window for generating the SPEED WINDOW OK signal in modbus movement flags register 35134.
Measurement is in ms.

*****

Address: **35148** **0x894C**

Name: Position window

Access: RW
Size: 2 WORD

Min: 1
Max: Depends on the conversion ratio between the internal position unit and the user-selected position unit
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION WINDOW HIGH															
	POSITION WINDOW LOW															

This register is used for setting the value of the speed window to generate the SPEED WINDOW OK signal in the modbus movement flags register 35134.
It is expressed in the amplified user-selected unit.

It is a long-signed type.

The amplification factor is contained in modbus register 35132: the AMPLIFIER FACTOR parameter.
It is a long-unsigned type.

*****

Address: **35150** **0x894E**

Name: Position window time

Access: RW
Size: 1 WORD

Min: 1
Max: 65000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION WINDOW TIME															

This register is used to set the minimum wait time in the current window for the system to generate the CURRENT WINDOW OK signal in modbus movement flags register 35134.
Measurement is in ms.

*****

Address: **35153** **0x8951**

Name: Position warning

Access: RW
Size: 2 WORD

Min: 0
Max: Depends on the conversion ratio between the internal position unit and the user-selected position unit
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION WARNING HIGH															
	POSITION WARNING LOW															

If position control is being applied, a warning can be generated in C2D_Man_Warning if the programmed maximum position error is exceeded during control.
This register is used to set the maximum position error that generates a position warning if it is exceeded.
The default value of 0 disables position control and the relative error.

It is expressed in the amplified user-selected unit.

It is a long-signed type.

The amplification factor is contained in modbus register 35132: the AMPLIFIER FACTOR parameter.
It is a long-unsigned type.

*****

Address: **35155** **0x8953**

Name: Position error

Access: RW
Size: 2 WORD

Min: 0
Max: Depends on the conversion ratio between the internal position unit and the user-selected position unit
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION ERROR HIGH															
	POSITION ERROR LOW															

If position control is being applied, an error can be generated in C1D_Man_Error if the programmed maximum position error is exceeded during control.
This register is used to set the maximum position error that generates a position error if it is exceeded.
The default value of 0 disables position control and the relative error.

It is expressed in the amplified user-selected unit.

It is a long-signed type.

The amplification factor is contained in modbus register 35132: the AMPLIFIER FACTOR parameter.
It is a long-unsigned type.

*****

Address: **35157** **0x8955**

Name: Speed Reference

Access: RW
Size: 1 WORD

Min: 1
Max: 6000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED REFERENCE															

This parameter sets the reference speed.

*****

Address: **35158** **0x8956**
Address: **35159** **0x8957**
Address: **35160** **0x8958**
Address: **35161** **0x8959**
Address: **35162** **0x895A**

Name: Digital out function

Access: RW
Size: 1 WORD

Min: 0
Max: 9
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DIGITAL OUT FUNCTION															

These registers are used to set the function assigned to individual digital outputs.
The association between register value and function is as follows:

0	NONE	No associated function, output is disabled
1	FAULT.	The logic level of the output switches to high if an error occurs on the drive.
2	I TIME	The logic level of the output switches to high when the supplied current exceeds the threshold programmed for tripping the timed current protection, according to the logic with which error 18 is generated.
3	LIMIT SW	The logic level of the output is switched to high if the drive detects that at least one of the two inputs associated with the travel limit switches is active
4	ENABLED	The output is active if the drive is enabled
5	CURRENT	The output is active if the supplied current is inside the current window
6	SPEED	The output is active if motor speed is inside the speed window
7	POSITION	The output is active if the current position is inside the position window
8	HOMING	The output is active if the homing procedure has concluded successfully
9	MB OUT	The output is enabled according to the contents of modbus register 00022

*****

Address: **35163** **0x895B**

Name: Quick stop time

Access: RW
Size: 1 WORD

Min: 5
Max: 10000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	QUICK STOP TIME															

Deceleration time for tripping limit switches. Measurement is in ms.

*****

Address: **35164** **0x895C**

Name: Asyncronus motor table index

Access: RO
Size: 1 WORD

Min: 0
Max: No. of asynchronous motors implemented in firmware.
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ASYNCHRONOUS MOTOR TABLE INDEX															

This register is used to reveal which motor has been selected from the set to predefined motors. The motor is selected with dedicated procedure 35171. If 0 is read, no motor has been selected. The parameters of the selected motor are overwritten in the volatile memory of the drive. To permanently store the selection, the set of parameters must be saved with the save command.

*****

Address: **35165** **0x895D**

Name: Motor control

Access: RW
Size: 1 WORD

Min: 0
Max: 2
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MOTOR CONTROL															

MOTOR DIRECTION
0: Torque control with limitation on maximum speed is applied.
1: Speed control is applied.
2: The type of control specified in the specific movement profile is applied.

This register is used to set the type of motor control applied.

*****

Address: **35166** **0x895E**

Name: Controller

Access: RW
Size: 1 WORD

Min: 0
Max: 2
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	CONTROLLER															

This register is used to set the active controller for the drive. The following can be selected:

CONTROLLER 0: Modbus is the active controller.
1: The keyboard is the active controller.
2: The digital inputs constitute the active controller.

The active controller controls motor movement and can modify parameters that can be changed only by the active controller.

*****

Address: **35167** **0x895F**

Name: Speed ref source

Access: RW
Size: 1 WORD

Min: 0
Max: 2
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	SPEED REF SOURCE															

This register is used to set the source of the speed reference when speed control is applied to the motor. The following can be selected:

SPEED REF SOURCE 0: The speed reference is fixed and assumes the value set in parameter 35157.
1: The speed reference is fixed and assumes the value set in parameter 35157, which can be changed with the ▲▼ keys on the programming keyboard.
2: The reference speed is derived from the value of the analogue input.

*****

Address: **35168** **0x895F**

Name: Torque factor

Access: RW
Size: 1 WORD

Min: 1
Max: 10000
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	TORQUE FACTOR															

This parameter is used to set the torque constant for the motor. The parameter is used exclusively to display the torque applied to the motor.
It does not affect the behaviour of the application, which expresses the torque reference as a current if torque control is being applied to the motor.
The value is in thousandths of a newton / amp.

*****

Address: **35169** **0x8961**

Name: Position module

Access: RW
Size: 2 WORD

Min: 0
Max: Depends on the conversion ratio between the internal position unit and the user-selected position unit
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	POSITION MODULE HIGH															
	POSITION MODULE LOW															

This register is used to set the position range in the user-selected unit. The position can assume values that range from -position module/2 (inclusive) to +position module/2 (exclusive).

Any requests for relative travel that place the final position outside the position module can show are nonetheless performed, and the position value is calculated cyclically from the module.

Example:
With the default scale factors, the position is set at 1000000, and the range for the position value is -50000 to 499999. If the current position is 400000 and a positive relative movement of 25000 user-selected units is requested, the motor performs 25 clockwise rotations, and the position value becomes -35000.

This parameter is expressed in the amplified user-selected unit.
It is a long-unsigned type.

The amplification factor is contained in modbus register 35132: the AMPLIFIER FACTOR parameter.
It is a long-unsigned type.

*****

Address: **35191** **0x8977**

Name: Device Id

Access: RW
Size: 1 WORD

Min: 1
Max: 247
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DEVICE ID															

This register is used to set the modus address of the drive.

To apply the change, all parameters must be saved using procedure 32842, and the drive must then be restarted.

*****

Address: **35192** **0x8978**

Name: Modbus timeout

Access: RW
Size: 1 WORD

Min: 0
Max: 65535
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MODBUS TIMEOUT															

This register sets a timeout for modbus communications.
Measurement is in ms.

*****

Address: **35193** **0x8979**

Name: Modbus baud rate index

Access: RW
Size: 1 WORD

Min: 0
Max: 5
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MODBUS BAUD RATE INDEX															

This parameter sets the speed of communication over the modbus.

0: 4800

1: 9600

2: 19200

3: 38400

4: 57600

5: 115200

To apply the change, all parameters must be saved using procedure 32842, and the drive must then be

restarted.

*****

Address: **35194** **0x897A**

Name: Modbus parity

Access: RW
Size: 1 WORD

Min: 0
Max: 2
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MODBUS PARITY															

This register sets the parity bit for modbus communications:

0: NONE The parity bit is set to 0.

1: ODD The parity bit in odd-numbered frames is set to 1

2: EVEN The parity bit in even-numbered frames is set to 1

To apply the change, all parameters must be saved using procedure 32842, and the drive must then be restarted.

*****

Address: **35195** **0x897B**

Name: Display value

Access: RW
Size: 1 WORD

Min: 0
Max: 6
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DISPLAY VALUE															

This register is used to select the information provided on the standard menu:

0: STATUS The standard menu displays the status of the drive.

1: SPEED The standard menu displays the speed of the motor.

2: I MOT The standard menu displays the current supplied to the motor.

3: V MOT The standard menu displays the phase voltage supplied to the motor.

4: INT TEMP The standard menu displays the temperature of the drive.

5: POSITION The standard menu displays the current position).

6: PROFILE The standard menu displays the profile being run.

*****

Address: **35196** **0x897C**

Name: Display backlight

Access: RW
Size: 1 WORD

Min: 0
Max: 1
Meas: N/A

Reset: Retentive

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	DISPLAY BACKLIGHT															

This register sets the backlight of the keyboard:

0: NO The back light in the display lights up when any key is pressed and shuts off if no command is given by the operator for 3 minutes.

1: YES The back light stays on.

12.5 PROCEDURES

Address: **00099** **0x0063**

Name: Reset errors

Access: WO
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to reset errors on the drive by writing 1 in modbus register 00099.

*****

Address: **00262** **0x0106**

Name: Reset to default parameter

Access: RW
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to reset drive parameters to default by writing 1 in modbus register 00262.

The register can be read to discover the status of procedure execution. Possible values are:

1 Procedure in progress
0 Procedure ended correctly
-1 Procedure ended with an error

*****

Address: **35128** **0x8938**

Name: Tuning motor and angle

Access: RW
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to reset drive parameters to default by writing 1 in modbus register 00262.

The register can be read to discover the status of procedure execution. Possible values are:

1 Procedure in progress
0 Procedure ended correctly
-1 Procedure ended with an error

*****

Address: **35129** **0x8939**

Name: Reset to default profile

Access: WO
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to reset profile parameters to default by writing 1 in modbus register 35129.

*****

Address: **32785** **0x8011**

Name: Reset min max

Access: WO
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to reset the minimum and maximum values detected by the drive. The procedure is run by writing 1 in modbus register 32785.

*****

Address: **32842** **0x804A**

Name: Save all parameter

Access: WO
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to save all parameters in non-volatile memory. The procedure is run by writing 1 in modbus register 32842.

*****

Address: **32843** **0x804B**

Name: Save all profile

Access: WO
Size: 1 WORD

Min: 1
Max: 1
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
																1

This procedure is used to save all profiles in non-volatile memory. The procedure is run by writing 1 in modbus register 32843.

*****

Address: **32913** **0x8091**

Name: Set pwm frequency

Access: WO
Size: 1 WORD

Range: 5000 to 15000, which are internally approximated to 5000; 10000; 15000
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

The PWM frequency change procedure accepts any value from 5000 to 15000.
The valueis in Hz.
The actual programmed value is the one closest to the 3 possible values (5000, 10000, 15000).

The programmed PWM frequency can be read using register 32972.

*****

Address: **35171** **0x8963**

Name: Change asynchronous motor

Access: WO
Size: 1 WORD

Min: 1
Max: No. of asynchronous motors implemented on the drive.
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

This procedure is used to change the active asynchronous motor.

*****

Address: **35172** **0x8964**

Name: Change synchronous motor

Access: WO
Size: 1 WORD

Min: 1
Max: No. of synchronous motors implemented on the drive.
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

This procedure is used to change the active synchronous motor.

*****

Address: **32975** **0x80CF**

Name: Change active motor control

Access: WO
Size: 1 WORD

Min: 1
Max: 2
Meas: N/A

Reset: N/A

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

This procedure is used to change the active motor control mode:

1: V/f control	Motor control with V/f rules for asynchronous motors
2: Synchronous control	Vector control of synchronous motors

13 TABLES OF DEFAULT PARAMETERS

13.1 Default parameters for synchronous motor

Parameter	Description	Default value	User-programmed value
23	Logic level of individual digital outputs	0	
57	Maximum position error value for generating warning	0	
100	Proportional speed gain	0	
101	Additional speed gain	0	
104	Proportional position gain	0	
106	Proportional current gain	0	
107	Additional current gain	0	
109	Peak RMS motor current (mA)	707	
110	Peak RMS drive current (mA)	15000	
111	Nominal RMS motor current (mA)	200	
112	Nominal RMS drive current (mA)	4200	
159	Maximum position error value for generating error	0	
203	Maximum drive temperature (°C)	85	
32594	Maximum speed value for generating error	100	
32769	Derived position gain	0	
32771	Maximum time that current limit can be exceeded (mS)	2000	
32827	Enabling of external braking resistance	0	
32828	External braking resistance (ohms)	200	
32831	Power rating of external braking resistance (W)	1500	
32904	Encoder direction	1	
32905	Type of position sensor 0 = not installed 1 = incremental 2 = resolver	2	
32908	Minimum boost voltage	0	
32909	Nominal boost voltage	230	
32910	Minimum freq. (Hz)	0	
32911	Nominal freq. (Hz)	50	
32914	Encoder pulses	512	
32918	DC brake time (ms)	500	
32944	Type of motor control 1 = V/f asynchronous 2 = Synchronous	2	
32953	Polar pairs	2	

32955	Motor direction imposed by wiring U, V, W	0	
32956	Hall sensor direction imposed by wiring	0	
32957	Phase angle	11100	
32959	Minimum speed	0	
32960	Maximum speed	6000	
32961	Direction of rotation	0	
32963	Maximum speed deviation value for generating warning, 0=disabled	0	
32964	Maximum speed deviation value for generating error, 0=disabled	0	
32965	Transducer position tuning completed	0	
32966	Activation of holding brake	0	
32967	Operating mode of holding brake	2	
32968	Delay on release of holding brake	0	
32969	RPM for release of holding brake	0	
32971	Logic level of holding brake output	0	
32972	PWM freq. (Hz)	0	
32973	DC braking voltage (V)	30	
32974	Slip for maximum torque (RPM)	300	
32978	RPM for locking of holding brake	0	
32979	Current for release of holding brake	0	
35100	Type of motor temperature sensor 0 = not installed 1 = NTC 2 = NC switch 3 = PTC	2	
35101	Maximum motor temperature (°C)	140	
35102	Logic level of digital input pins	0	
35105	Analogue output source	0	
35106	Analogue end-of-scale output	1000	
35107	Acceleration time	2000	
35108	Deceleration time	2000	
35109	Jog speed	100	
35111	Maximum reference speed	4000	
35114	Time of acc. and dec. ramps in jog mode	20	
35115	Ratio between internal position unit and external position unit, numerator	655360000	
35117	Ratio between internal position unit and external position unit, denominator	10000	
35119	Numerator of pulse-direction tracking ratio	128	
35120	Denominator of pulse-direction tracking ratio	1	
35121	Index of selected synchronous motor	0	

35122	Switch search speed during the homing procedure.	100	
35123	Zero pulse search speed during the homing procedure	10	
35124	Acceleration and deceleration time for switch search speed during the homing procedure	30	
35125	Position value assigned at the end of the homing procedure	0	
35135	Active type of homing	35	
35136	Active analogue input	0	
35137	Offset on 0-10 Volt input (mV)	1000	
35138	Offset on 4-20 mA input (uA)	4000	
35139	Maximum reference speed with analogue reference speed	2000	
35140	Minimum reference speed with analogue reference speed	10	
35141	Maximum reference torque (current or RPM) supplied with analogue reference torque	200	
35142	Minimum reference torque (current or RPM) supplied with analogue reference torque	10	
35143	Disabling of local enabling inputs with modbus control	0	
35144	Current window for current threshold	50	
35145	Wait time in current window (ms)	100	
35146	Speed window for speed threshold	50	
35147	Wait time in speed window (ms)	100	
35148	Position window for target position, in user-selected unit	20	
35150	Wait time in position window (ms)	100	
35153	Position window for position warning, in user-selected unit	0	
35155	Position window for position error, in user-selected unit	0	
35157	Programmed reference value	0	
35158	Function associated with digital output 1	1	
35159	Function associated with digital output 2	4	
35160	Function associated with digital output 3	2	
35161	Function associated with digital output 4	7	
35162	Function associated with digital output 5	8	
35163	Quick stop time	20	
35164	Index of selected asynchronous motor	0	
35165	Type of motor control applied	1	
35166	Active controller	2	

35167	Selected reference source	0	
35168	Amplified torque factor	0	
35169	User position module	600000000	
35191	Modbus ID of drive	1	
35192	Timeout on modbus bus	1500	
35193	Index of modbus baud rate table	4	
35194	Modbus parity	0	
35195	Selected display function	0	
35196	Backlight mode	0	

13.2 Default parameters for asynchronous motor

Parameter	Description	Default value	User-programmed value
23	Logic level of individual digital outputs	0	
57	Maximum position error value for generating warning	0	
100	Proportional speed gain	0	
101	Additional speed gain	0	
104	Proportional position gain	0	
106	Proportional current gain	0	
107	Additional current gain	0	
109	Peak RMS motor current (mA)	1000	
110	Peak RMS drive current (mA)	15000	
111	Nominal RMS motor current (mA)	200	
112	Nominal RMS drive current (mA)	4200	
159	Maximum position error value for generating error	0	
203	Maximum drive temperature (°C)	85	
32594	Maximum speed value for generating error	100	
32769	Derived position gain	0	
32771	Maximum time that current limit can be exceeded (mS)	2000	
32827	Enabling of external braking resistance	0	
32828	External braking resistance (ohms)	200	
32831	Power rating of external braking resistance (W)	1500	
32904	Encoder direction	1	
32905	Type of position sensor 0 = not installed	0	

	1 = incremental 2 = resolver		
32908	Minimum boost voltage	0	
32909	Nominal boost voltage	230	
32910	Minimum freq. (Hz)	0	
32911	Nominal freq. (Hz)	50	
32914	Encoder pulses	512	
32918	DC brake time (ms)	500	
32944	Type of motor control 1 = V/f, asynchronous vector 2 = Synchronous	1	
32953	Polar pairs	1	
32955	Motor direction imposed by wiring U, V, W	0	
32956	Hall sensor direction imposed by wiring	0	
32957	Phase angle	11100	
32959	Minimum speed	0	
32960	Maximum speed	6000	
32961	Direction of rotation	0	
32963	Maximum speed deviation value for generating warning, 0=disabled	0	
32964	Maximum speed deviation value for generating error, 0=disabled	0	
32965	Transducer position tuning completed	0	
32966	Activation of holding brake	0	
32967	Operating mode of holding brake	2	
32968	Delay on release of holding brake	0	
32969	RPM for release of holding brake	0	
32971	Logic level of holding brake output	0	
32972	PWM freq. (Hz)	0	
32973	DC braking voltage (V)	30	
32974	Slip for maximum torque (RPM)	300	
32978	RPM for locking of holding brake	0	
32979	Current for release of holding brake	0	
35100	Type of motor temperature sensor 0 = not installed 1 = NTC 2 = NC switch 3 = PTC	0	
35101	Maximum motor temperature (°C)	140	
35102	Logic level of digital input pins	0	
35105	Analogue output source	0	
35106	Analogue end-of-scale output	1000	

35107	Acceleration time	2000	
35108	Deceleration time	2000	
35109	Jog speed	100	
35111	Maximum reference speed	4000	
35114	Time of acc. and dec. ramps in jog mode	20	
35115	Ratio between internal position unit and external position unit, numerator	655360000	
35117	Ratio between internal position unit and external position unit, denominator	10000	
35119	Numerator of pulse-direction tracking ratio	128	
35120	Denominator of pulse-direction tracking ratio	100	
35121	Index of selected synchronous motor	0	
35122	Switch search speed during the homing procedure	100	
35123	Zero pulse search speed during the homing procedure	10	
35124	Acceleration and deceleration time for switch search speed during the homing procedure	30	
35125	Position value assigned at the end of the homing procedure	0	
35135	Active type of homing	35	
35136	Active analogue input	0	
35137	Offset on 0-10 Volt input (mV)	1000	
35138	Offset on 4-20 mA input (uA)	4000	
35139	Maximum reference speed with analogue reference speed	2000	
35140	Minimum reference speed with analogue reference speed	10	
35141	Maximum reference torque (current or RPM) supplied with analogue reference torque	200	
35142	Minimum reference torque (current or RPM) supplied with analogue reference torque	10	
35143	Disabling of local enabling inputs with modbus control	0	
35144	Current window for current threshold	50	
35145	Wait time in current window (ms)	100	
35146	Speed window for speed threshold	50	
35147	Wait time in speed window (ms)	100	
35148	Position window for target position, in user-selected unit	20	
35150	Wait time in position window (ms)	100	
35153	Position window for position warning, in user-selected unit	0	

35155	Position window for position error, in user-selected unit	0	
35157	Programmed reference value	0	
35158	Function associated with digital output 1	1	
35159	Function associated with digital output 2	4	
35160	Function associated with digital output 3	2	
35161	Function associated with digital output 4	7	
35162	Function associated with digital output 5	8	
35163	Quick stop time	20	
35164	Index of selected asynchronous motor	0	
35165	Type of motor control applied	1	
35166	Active controller	2	
35167	Selected reference source	0	
35168	Amplified torque factor	0	
35169	User position module	600000000	
35191	Modbus ID of drive	1	
35192	Timeout on modbus bus	1500	
35193	Index of modbus baud rate table	4	
35194	Modbus parity	0	
35195	Selected display function	0	
35196	Backlight mode	0	