

# Command channel

## Command channel: local or remote command

A command channel gives the possibility to command the motor by the soft starter (start, stop...). It can also read or write parameters.

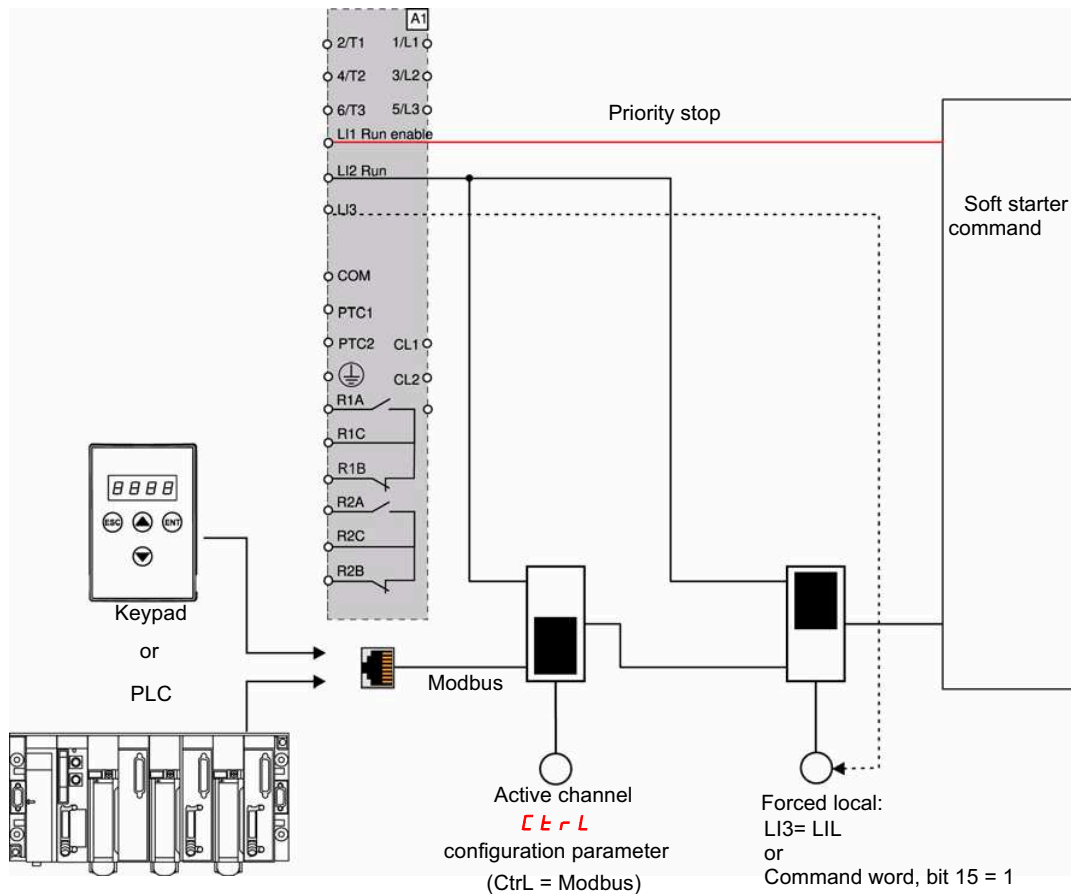
In local command mode, the Altistart 22 can be set from the display terminal:

- Use the 4 keys to enter into the menu.

In remote command, the Altistart 22 soft starter can be set from the remote keypad:

- The remote keypad can be used in a similar way than the embedded keypad, it means that the HMI on the remote keypad has the same behavior as the HMI on the product.

**Note:** Some command channels can also read or write parameters.



In this example, LI3 is configured to forced local command (LIL).

If **C t r L** = Modbus + forced local: it's forced local in first.

**LOCAL mode:** The soft starter is entirely controlled via the terminals. The parameters can be read and written via Modbus. The soft starter remains in LOCAL mode as long as the **C t r L** = 0.

**FORCED LOCAL mode:** The soft starter is entirely controlled via the terminals. Write access to the parameters from the Modbus link is prohibited. Reading is possible.

**Note:** LI1 must be activated (LI1 = 1) to allow the remote command.

A switch can be used on LI1 if a local stop by the terminal is needed. In this case, the stop will be in freewheel.

# Command channel

## Behavior on channel change

In the **CDP** menu (Advanced communication), the active channel can be changed via **CTRL** parameter:

Code	Name	Range	Default value
<b>CTRL</b>	command channel	0: local command 1: Remote command: Modbus	0

**CTRL** parameter is a configuration parameter that can be modified when the motor is stopped.

In the **IO** menu (Advanced IO), a Logic input can be assigned to local command: :

Code	Name	Value
<b>L12</b> or <b>L13</b>	Logic input 2 or logic input 3	<b>LIL</b> : Forced Local command

The local remote input is active at level 1.

When the input local remote is active, the active command channel is the local channel.

When the local force function is active from a Logic input, the parameters can only be written by the local HMI or the external keypad. If written by Modbus function 6 or 16, the exception 1 bad function is sent back.

When the local force function is active, Modbus command word and parameters can be written also by Modbus.

The Logic input assign to "Forced local command" has the priority on bit 15 from Modbus command word. If L13 is assigned to LIL and L13=1, even if bit 15=1 the "Forced local command" is active.

When CTRL = Modbus and LI force local command activated, then a Modbus request 6 or 16 sends back an exception code 1 illegal function.

When on Modbus, only L11 stop is taken into account.

## Command word

The control register write definition is changed as follows:

The Altistart 22 incorporates one control register intended for controlling the Altistart 22.

Address: The control register address is: 752.

In order to control the Altistart 22 using the control register:

- Use Function 16 or function 6
- Use Address\_High (page) = 2
- Use Address\_Low = 240 (0F0H)
- Write to one register only
- Set comm\_control (**CTRL**) to 1 for Modbus

Bit	Function	Comment
bit 0	RUN/STOP	Write "1" (On) to RUN Write "0" (oFF) to STOP, in configured stop (DEC parameter)
bit 1	reserved	
bit 2	reserved	
bit 3	trip reset	Write "1" to reset
bit 4	reserved	
bit 5	reserved	
bit 6	reserved	
bit 7	reserved	
bit 8	reserved	
bit 9	reserved	
bit 10	Freewheel stop	Write "1" to set freewheel deceleration, linked with bit 0
bit 11	2nd set of parameters	Write "1" to enable second set of parameters
bit 12	reserved	
bit 13	reserved	
bit 14	reserved	
bit 15	Forced local command	Write "1" (On) forces local command

# Command channel

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## Status word

The Status register address is: 256

- Use Function 3 only
- Use Address\_High (page) = 1
- Use Address\_Low = 0 (00H)
- Read one register only

Bit	Function	Comment
bit 0	Ready	All the conditions that will permit the operation of a switching device by the remote host controller have been fulfilled.
bit 1	On	The main circuit contacts are closed or the semiconductor switches of semiconductor switching device are in the conducting state (ACC, DEC and BYPASS).
bit 2	Trip	A trip condition exists.
bit 3	Warning	A warning condition exists.
bit 4	Reserved	
bit 5	LI3	
bit 6	LI2	
bit 7	LI1	
bit 8	(Motor current in %)	The motor current is expressed as a percentage of the motor rated current. Range is 0-200%. 6 bits code 200% = 63 (decimal) = 111111 (binary)
bit 9		
bit 10		
bit 11		
bit 12		
bit 13		
bit 14	Local control	The indication to a remote host controller that as a result of operator intervention, commands received will not be accepted or acted upon (forced local command).
bit 15	Ramping	Accelerating or decelerating the motor.

# Modbus Function

This section describes the connection to the bus or network, signaling, diagnostics, and configuration of the communication-specific parameters via the 7-segment LED display. It also describes the communication services of the Modbus protocol.

## Modbus Protocol

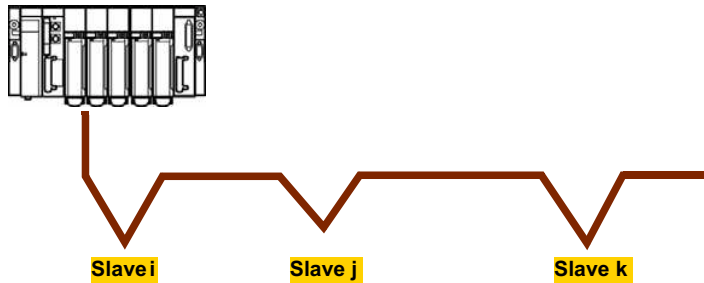
The transmission mode used is RTU mode. The frame contains no message header byte, nor end of message bytes. It is defined as follows:



The data is transmitted in binary code.  
 CRC16: cyclical redundancy check.  
 The end of the frame is detected on a silence greater than or equal to 3 characters.

## Principle

The Modbus protocol is a master-slave protocol.  
 Master



Only one device can transmit on the line at any time. The master manages the exchanges and only it can take the initiative. It interrogates each of the slaves in succession. No slave can send a message unless it is invited to do so. The master repeats the question when there is an incorrect exchange, and declares the interrogated slave absent if no response is received within a given time period. If a slave does not understand a message, it sends an exception response to the master. The master may or may not repeat the request.

Direct slave-to-slave communications are not possible.

For slave-to-slave communication, the application software must therefore be designed to interrogate a slave and send back data received to the other slave.

- Two types of dialogue are possible between master and slaves:
- the master sends a request to a slave and waits for its response
  - the master sends a request to all slaves without waiting for a response (broadcasting principle)

## Addresses

- The soft starter Modbus address can be configured from 1 to 247.
- Address 0 coded in a request sent by the master is reserved for broadcasting. ATS22 take account of the request, but do not respond to it.

## Supported Modbus functions

The Altistart 22 supports the following Modbus functions.

Function name	Code	Description	Remarks
Read holding registers	03 16#03	Read N output words	Max PDU length : 63 words
Write one output word	06 16#06	Write one output word	
Write multiple registers	16 16#10	Write N output word	Max PDU length : 61 words
(Sub-function) Read device Identification	43 16#2B	Read device identification	

# Modbus Function

The following paragraphs describes each supported function.

## Read Holding registers

### Request

Function code	1 Byte	0x03
Starting Address	2 Bytes	0x0000 to 0xFFFF
Quantity of Registers	2 Bytes	1 to 63 (0x 3F)

### Response

Function code	1 Byte	0x03
Byte count	1 Byte	2 x N*
Register value	N* x 2 Bytes	

\*N: Quantity of Registers

### Error

Error code	1 Byte	0x83
Exception code	1 Byte	01 or 02 or 03 or 04 (see details on page 72)

### Example

**Note:** Hi = high order byte, Lo = low order byte.

This function can be used to read all ATS22 words, both input words and output words.

#### Request

Slave no.	03	No. of first word Hi   Lo	Number of words Hi   Lo	CRC16 Lo   Hi
1 byte	1 byte	2 bytes	2 bytes	2 bytes

#### Response

Slave no.	03	Number of bytes read	First word value Hi   Lo	-----	Last word value Hi   Lo	CRC16 Lo   Hi
1 byte	1 byte	1 byte	2 bytes		2 bytes	2 bytes

Example: read 2 words 'ACC and DEC at Modbus address 19 and 20 to W3105 (16#0013 to 16#0014) in slave 2, using function 3, where:

- ACC - Acceleration = 10
- DEC - Deceleration = 0

Request	02	03	0019	0002	CRC16
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Response	02	03	04	000A	0000	CRC16
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Value of:                   W0019                   W020  
Parameters:                ACC                    DEC

# Modbus Function

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## Write one output word

### Request

Function code	1 Byte	<b>0x06</b>
Register Address	2 Bytes	0x0000 to 0xFFFF
Register value	2 Bytes	0x0000 to 0xFFFF

### Response

Function code	1 Byte	<b>0x06</b>
Register Address	2 Bytes	0x0000 to 0xFFFF
Register value	2 Bytes	0x0000 to 0xFFFF

### Error

Error code	1 Byte	<b>0x86</b>
Exception code	1 Byte	01 or 02 or 03 or 04 (see details on page <a href="#">72</a> )

### Example

Request and response (the frame format is identical)

Slave no.	06	Word number		Value of word		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Example: write value 16#0008 in word W0022 (16#2329) in slave 2 Snb Number of starts 8.

Request and response	02	06	0016	0008	CRC16
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# Modbus Function

## Read Device Identification

ID	Name / Description	Type
0x00	VendorName	ASCII String
0x01	ProductCode	ASCII String
0x02	MajorMinorRevision	ASCII String

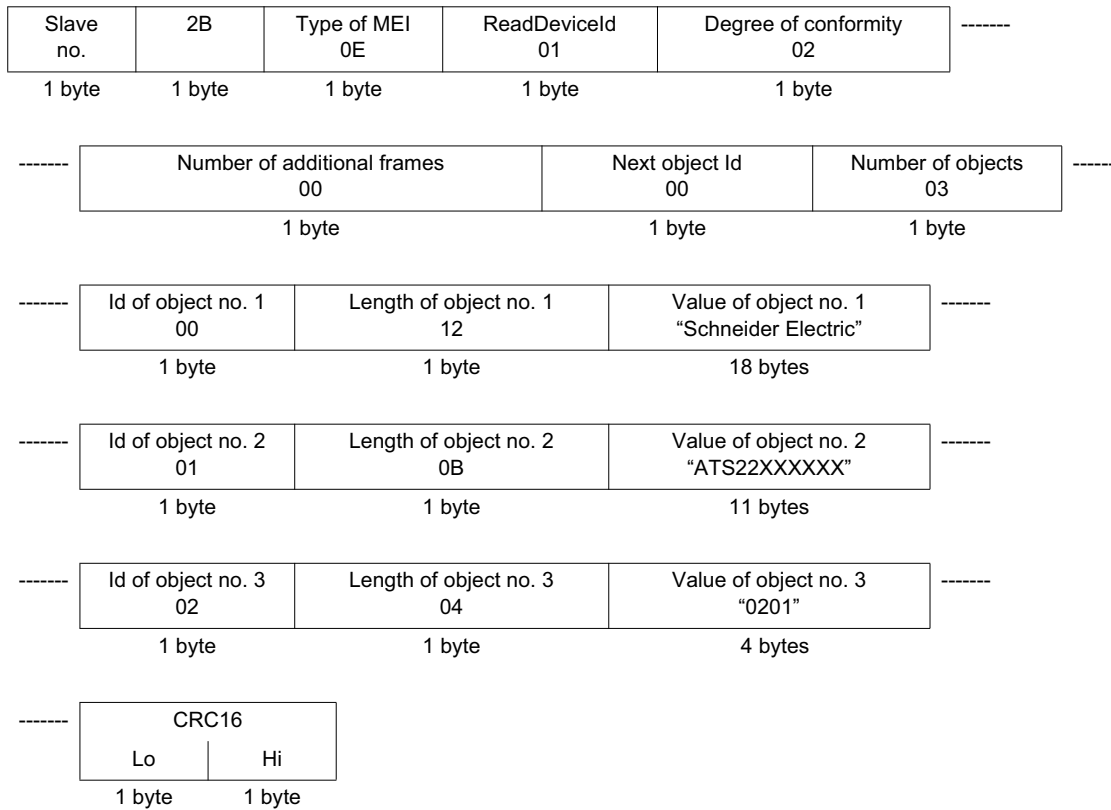
### Example

#### Default values to be detailed

Request

Slave no.	2B	Type of MEI 0E	ReadDeviceld 01	Object Id 00	CRC16 Lo   Hi	
1 byte	1 byte	1 byte	1 byte	1 byte	2 bytes	

Response



The total response size equals 49 bytes

The three objects contained in the response correspond to the following objects:

- Object no. 1: Manufacturer name (always "Schneider Electric", ie. 18 bytes).
- Object no. 2: Device reference (ASCII string; *for example*: "ATS22XXXXXX", ie. 11 bytes).
- Object no. 3: Device version, in "MMmm" format where "MM" represents the determinant and "mm" the subdeterminant (4-bytes ASCII string; *for example*: "0201" for version 2.1).

**Note:** The response to function 43 may be negative; in this case, the response located at the top of the next page is sent by the Altistart 22 rather than the response described above.

# Modbus Function

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## Error management

### Exception responses

An exception response is returned by a slave when it is unable to perform the request which is addressed to it.

Format of an exception response:

Slave no.	Response code	Error code	CRC16	
			Lo	Hi
1 byte	1 byte	1 byte	2 bytes	

**Response code:** request function code + 16#80.

#### Error code:

- 1 = The function requested is not recognized by the slave
- 2 = The bit or word addresses indicated in the request do not exist in the slave
- 3 = The bit or word values indicated in the request are not permissible in the slave
- 4 = The slave has started to execute the request but cannot continue to process it completely

### CRC16 calculation

The CRC16 is calculated on all the message bytes by applying the following method:

Initialize the CRC (16-bit register) to 16#FFFF.

Enter the first to the last byte of the message:

```
CRC XOR <byte> → CRC
Enter 8 times
Move the CRC one bit to the right
If the output bit = 1, enter CRC XOR 16#A001 → CRC
End enter
End enter
```

The CRC obtained will be transmitted with the low order bytes sent first, followed by the high order ones (unlike the other data contained in Modbus frames).

XOR = exclusive OR.



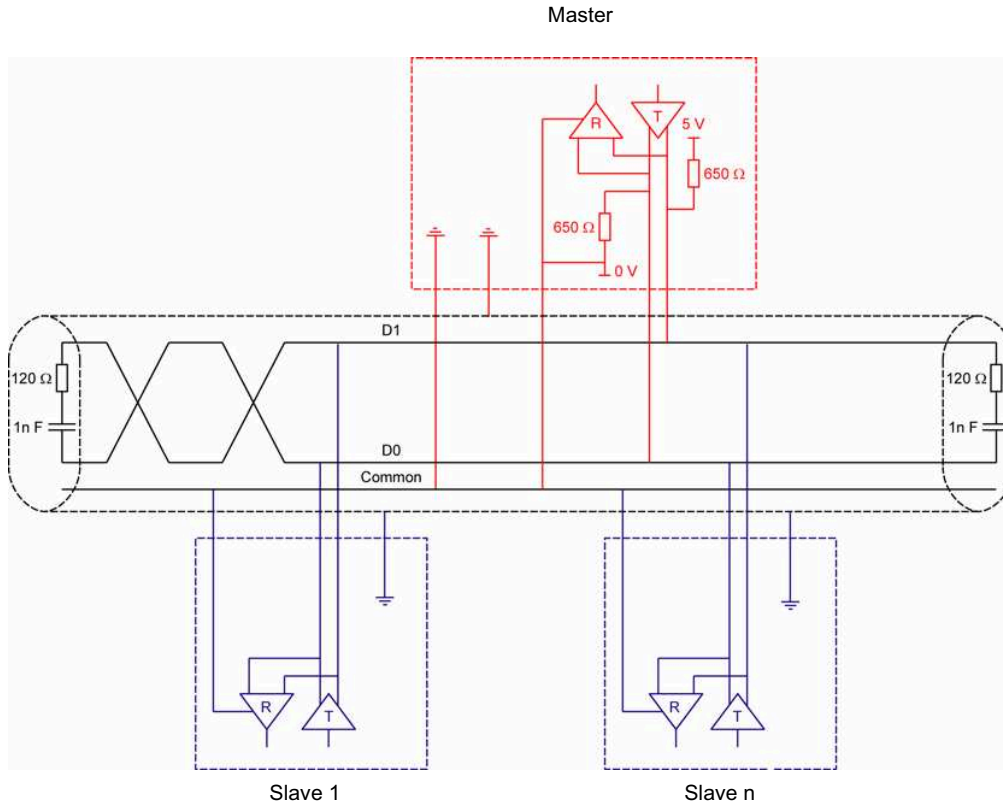
# Connection to RS485 bus

## Standard schematic

The standard schematic corresponds to the Modbus specification published on the [Modbus.org](http://Modbus.org) site in 2002 (Modbus\_over\_serial\_line\_V1.pdf, Nov 2002) and in particular to the schematic of the 2-wire multidrop serial bus.

The ATS22 follows this specification.

### Schematic diagram:



Type of trunk cable	Shielded cable with 1 twisted pair and at least a 3 <sup>rd</sup> conductor
Maximum length of bus	1000 m at 19200 bps with the Schneider Electric TSX CSA●●● cable
Maximum number of stations (without repeater)	32 stations, ie. 31 slaves
Maximum length of tap links	<ul style="list-style-type: none"> <li>• 20 m for one tap link</li> <li>• 40 m divided by the number of tap links on a multiple junction box</li> </ul>
Bus polarisation	<ul style="list-style-type: none"> <li>• One 450 to 650 <math>\Omega</math> pull-down resistor at 5 V (650 <math>\Omega</math> recommended)</li> <li>• One 450 to 650 <math>\Omega</math> pull-down resistor at the Common (650 <math>\Omega</math> recommended)</li> </ul> This polarization is recommended for the master.
Line terminator	One 120 $\Omega$ 0.25 W resistor in series with a 1 nF 10 V capacitor
Common polarity	Yes (Common), connected to the protective ground at one or more points on the bus

# Maintenance

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## Servicing

It is advisable to perform the following actions regularly:

- Check the condition and tightness of connections.
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective (average service life of fans: 3 to 5 years depending on the operating conditions).
- Ensure proper fan operation.
- Remove any dust from the soft starter.
- Check physical damages to the soft starter.

## Spare parts and repairs

Consult Schneider Electric products support.

## Soft starter does not start, no trip code displayed

- No display:
  - check that the line supply is present on the control supply CL1/CL2,
  - check if a short circuit is not existing on the Modbus network cable (especially between RJ45 pin 7 and RJ45 pin3 or pin8. See pages [35](#) and [36](#)).
- Check that the code displayed does not correspond to the normal state of the soft starter (see page [46](#)).
- Check for the presence of the RUN/STOP commands (see page [37](#)).

## Soft starter does not start, trip code displayed

- Trip code flashes on the display.
- Storing of the last 7 trips, visible with SoMove software workshop.
- The soft starter locks and the motor stops with to freewheel mode.

### **DANGER**

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altistart 22. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this soft starter, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- Before servicing the soft starter:
  - Disconnect all power, including external control power that may be present.
  - Place a "DO NOT TURN ON" label on all power disconnects.
  - Lock all power disconnects in the open position.
- Install and close all covers before applying power or starting and stopping the soft starter.

**Failure to follow these instructions will result in death or serious injury.**

Trip code displayed	Name	Remedy
<b>b P F</b>	Bypass contactor detected fault	<ul style="list-style-type: none"> <li>• Check for a welded bypass contactor or shorted SCR</li> <li>• Replace it if necessary</li> </ul>
<b>C F F</b>	Invalid configuration on power-up	<ul style="list-style-type: none"> <li>• Revert to the factory setting in the soft starter <b>U E I L</b> menu</li> <li>• Reconfigure the soft starter</li> </ul>
<b>E E F</b>	External detected fault	<ul style="list-style-type: none"> <li>• Clear the cause of the detected fault</li> </ul>
<b>G r d F</b>	Ground leakage current detected fault	<ul style="list-style-type: none"> <li>• Check the electrical insulation of the motor</li> <li>• Check the installation</li> <li>• Check the values of <b>G r d d</b>, <b>G r d t</b> parameters in <b>P r O</b> menu page <a href="#">57</a></li> </ul>
<b>I n F</b>	Internal detected fault	<ul style="list-style-type: none"> <li>• Disconnect and reconnect the control supply. If the detected fault persists, contact Schneider Electric product support</li> </ul>
<b>O C F</b>	Motor overcurrent	<ul style="list-style-type: none"> <li>• Check the values of <b>O I d</b> and <b>O I t</b> parameters in <b>P r O</b> menu page <a href="#">56</a></li> </ul>
<b>O H F</b>	Over heat detected fault	<ul style="list-style-type: none"> <li>• Check the sizing of the soft starter in relation to the motor and the mechanical requirement</li> <li>• Check the operation of the fan (if the Altistart 22 used has one), ensuring that the air passage is not obstructed in any way and the heatsink is clean. Ensure that the mounting recommendations are observed</li> <li>• Wait for the Altistart 22 cooling before restarting</li> </ul>
<b>O L F</b>	Overload motor	<ul style="list-style-type: none"> <li>• Check the mechanism (wear, mechanical play, lubrication, blockages, etc.)</li> <li>• Check the sizing of the soft starter motor in relation to the mechanical requirement</li> <li>• Check the value of <b>t H P</b> parameter in <b>S E t</b> menu page <a href="#">52</a> and <b>I n</b> parameter in <b>c o n F</b> menu page <a href="#">50</a></li> <li>• Wait for the motor to cool before restarting</li> </ul>
<b>O S F</b>	Overvoltage	<ul style="list-style-type: none"> <li>• Check <b>U L n</b> parameter in <b>c o n F</b> menu</li> <li>• Check the power supply circuit and voltage</li> <li>• Check <b>O S d</b> and <b>O S t</b> parameters in <b>P r O</b> menu</li> </ul>
<b>O t F</b>	Motor Over Temperature <ul style="list-style-type: none"> <li>• Motor thermal trip detected by the PTC probes</li> </ul>	<ul style="list-style-type: none"> <li>• Check the mechanism (wear, mechanical play, lubrication, blockages, etc.)</li> <li>• Check the sizing of the soft starter motor in relation to the mechanical requirement</li> <li>• Check the value of <b>P t C</b> setting in <b>P r O</b> menu page <a href="#">59</a></li> <li>• Wait for the motor to cool before restarting</li> </ul>

# Diagnostics / Troubleshooting

Trip code displayed	Name	Remedy
<b>PHbd</b>	Phase unbalance	<ul style="list-style-type: none"> <li>Check the line voltage.</li> <li>Check the values of <b>Ubd</b>, <b>Ubt</b> parameters in <b>PrO</b> menu page <b>57</b>.</li> </ul>
<b>PHF</b>	Loss of a line phase	<ul style="list-style-type: none"> <li>Check the line voltage, the connection to the soft starter and any isolating devices located between the line and the soft starter (contactors, fuses, circuit breakers, etc.).</li> <li>Check the motor connection and any isolating devices located between the soft starter and the motor (contactors, circuit breakers, etc.).</li> <li>Check the motor state.</li> </ul>
	Line frequency, out of tolerance This detected fault can be configured in <b>PrO</b> menu	<ul style="list-style-type: none"> <li>Check the line frequency.</li> <li>Check the configuration of <b>PHL</b>.</li> </ul>
<b>PIF</b>	Phase inversion Line phase inversion does not conform to the selection made by <b>PHr</b> in <b>PrO</b> menu	<ul style="list-style-type: none"> <li>Invert two lines phases or set <b>PHr</b> = <b>OFF</b>.</li> </ul>
<b>ErAP</b>	Trap code	<ul style="list-style-type: none"> <li>Disconnect and reconnect the control supply. If the detected fault persists, contact Schneider Electric support.</li> </ul>
<b>SCF</b>	Short circuit: <ul style="list-style-type: none"> <li>short-circuit on soft starter output</li> </ul>	<ul style="list-style-type: none"> <li>Switch the soft starter off.</li> <li>Check the connecting cables and the motor insulation.</li> <li>Check the thyristors.</li> <li>Check the bypass contactor (contact stuck).</li> </ul>
<b>SLF</b>	Modbus Time Out	<ul style="list-style-type: none"> <li>Serial link detected fault. Check the RS485 connection.</li> </ul>
<b>SnbF</b>	Too many starts	<ul style="list-style-type: none"> <li>The number of soft starts has exceeded the maximum allowed by <b>Snb</b> in <b>SLG</b> period. See <b>Snb</b> page <b>53</b>.</li> </ul>
<b>SSCr</b>	Shorted thyristor or wrong connection	<ul style="list-style-type: none"> <li>Check the thyristors.</li> <li>Check the bypass contactor (contact stuck).</li> <li>Check the motor connections.</li> </ul>
<b>SEF</b>	Starting time detected fault <ul style="list-style-type: none"> <li>Too long start time</li> </ul>	<ul style="list-style-type: none"> <li>Check the mechanism (wear, mechanical play, lubrication, blockages, etc.)</li> <li>Check that <b>ELS</b> (Max start time) is bigger than <b>ACC</b> (Acceleration time). See <b>SEE</b> menu page <b>51</b>.</li> <li>Check the sizing of the soft starter motor in relation to the mechanical requirement</li> <li>Check ILt value : if the value is too low, the motor may not reach acceleration and full speed.</li> </ul>
<b>EbS</b>	Too many starts	<ul style="list-style-type: none"> <li>Wait 5 minutes for frame size A.</li> <li>Wait 15 minutes for frame sizes B, C, D and E.</li> </ul> <p><b>EbS</b> appears after <b>SnbF</b> trip message, when trying to reset the soft starter before end of the timer.</p>
<b>UCF</b>	Motor underload (undercurrent)	<ul style="list-style-type: none"> <li>Check the values of <b>Uld</b> and <b>Ule</b> parameters in <b>PrO</b> menu page <b>57</b>.</li> </ul>
<b>USF</b>	Under voltage or no voltage	<ul style="list-style-type: none"> <li>Check <b>Uln</b>, <b>USd</b> and <b>USt</b> parameters in <b>PrO</b> menu</li> <li>Check line voltage.</li> </ul>

## Remote keypad messages

Display	Message	Description
<b>InIt</b>		On initializing itself Microcontroller initializing. Communication configuration searching.
<b>COE</b>	flashing	Communication interruption It has 50 ms time out. This message is shown after 20 times retrying.
<b>A-17</b>	flashing	Key alarm <ul style="list-style-type: none"> <li>Key has been held consecutively more than 10 seconds.</li> <li>Membrane switch disconnected.</li> <li>Keypad waked up while a key is holding.</li> </ul>
<b>CLr</b>	flashing	Confirm trip reset This is shown when : First time STOP key has been pressed while the soft starter has tripped in detected fault.
<b>dEUE</b>	flashing	Soft starter mismatch Soft starter type (brand) did not match with keypad type (brand).
<b>rONE</b>	flashing	ROM trip Keypad ROM detected fault.
<b>rANE</b>	flashing	RAM trip Keypad RAM detected fault.
<b>CPUE</b>	flashing	CPU trip Keypad CPU detected fault.

# Parameter Index and Modbus addresses

Code	Page	Name	Unit	Modbus code and Adjustment Range (1)	Description	Modbus address	Factory setting	User setting
<i>A C C</i>	<a href="#">52</a>	Acceleration time	s	<i>1 to 60</i>	-	19	10	
<i>A C C 2</i>	<a href="#">55</a>	2nd acceleration time	s	<i>1 to 60</i>	-	42	10	
<i>A d d</i>	<a href="#">62</a>	Modbus address	-	0 = <i>o F F</i> 1 to <i>2 4 7</i>	off Modbus address	80	oFF	
<i>b S t</i>	<a href="#">53</a>	Boost time	s	<i>0. 0 to 1. 0</i>	1 with Modbus = 0.1s	34	0	
<i>C o d</i>	<a href="#">50</a>	Setting lock	-	0 = <i>n L O C</i> 1 = <i>L O C</i>	not locked locked	4	nLoc	
<i>C t r L</i>	<a href="#">62</a>	Command channel	-	0 = <i>L C L</i> 1 = <i>d b S</i>	0 – Local (LCL) 1 – Modbus (dbS)	84	LCL	
<i>d E C</i>	<a href="#">52</a>	Deceleration time	s	0 = <i>F r E E</i> 1 to <i>60</i>	freewheel deceleration -	20	FrEE	
<i>d E C 2</i>	<a href="#">55</a>	2nd deceleration time	s	0 = <i>F r E E</i> 1 to <i>60</i>	freewheel deceleration -	43	FrEE	
<i>d E F 1</i>	<a href="#">63</a>	Trip history 1	-	01 = <i>U C F</i> 02 = <i>O C F</i> 03 = <i>P H b d</i> 04 = <i>G r d F</i>	01 = Motor underload (undercurrent) 02 = Motor overcurrent 03 = Phase unbalance 04 = Ground leakage current detected fault	282	-	
<i>d E F 2</i>	<a href="#">63</a>	Trip history 2	-	05 = <i>O L F</i> 06 = <i>O t F</i> 07 = <i>O H F</i> 08 = <i>P I F</i> 09 = <i>P H F</i> 10 = <i>U S F</i> 11 = <i>O S F</i> 12 = <i>S t F</i> 13 = <i>S n b F</i> 14 = <i>S S C r</i> 15 = <i>E t F</i> 16 = <i>I n F</i> 17 = <i>S L F</i> 18 = <i>t r A P</i> 19 = <i>S C F</i> 20 = <i>b P F</i> 21 = <i>C F F</i>	05 = Overload motor 06 = Motor Over Temperature 07 = Over heat detected fault 08 = Phase inversion 09 = Loss of a line phase 10 = Under voltage or no voltage 11 = Over Voltage 12 = Starting time detected fault 13 = Too Many Starts 14 = Shorted thyristor or wrong connection 15 = External detected fault 16 = Internal detected fault 17 = Modbus Time Out 18 = Trap code 19 = Short-circuit 20 = Bypass contactor detected fault 21 = Invalid configuration on power-up	283	-	
<i>d E F 3</i>	<a href="#">63</a>	Trip history 3	-			284	-	
<i>d E F 4</i>	<a href="#">63</a>	Trip history 4	-			285	-	
<i>d E F 5</i>	<a href="#">63</a>	Trip history 5	-			286	-	
<i>d E F 6</i>	<a href="#">63</a>	Trip history 6	-			287	-	
<i>d E F 7</i>	<a href="#">63</a>	Trip history 7	-			288	-	
<i>d E F 8</i>	<a href="#">63</a>	Trip history 8	-			289	-	
<i>d E F 9</i>	<a href="#">63</a>	Trip history 9	-			290	-	
<i>d E F t</i>	<a href="#">63</a>	Total number of trips	-	-	-	278	-	
<i>d I C L</i>	<a href="#">63</a>	Trip current	A	<i>0 to 999</i>	-	280	-	
<i>d L t A</i>	<a href="#">50</a>	Connection type	-	0 = <i>L I n E</i> 1 = <i>d L t</i>	in line connection inside delta connection	1	<i>L I n E</i>	
<i>E d C</i>	<a href="#">52</a>	End of deceleration	-	<i>0 to 10</i>	-	21	0	
<i>F A n</i>	<a href="#">61</a>	Fan management	-	0 = <i>A U t o</i> 1 = <i>O n</i> 2 = <i>o F F</i> 3 = <i>H A n d</i>	auto on off manual	76	<i>A U t o</i>	
<i>F C S</i>	<a href="#">64</a>	Back to factory settings	-	<i>1</i>	= 1 to perform FCS	130	-	

(1) Modbus code = Soft starter message

example : *o F F* on the soft starter will be equivalent to "0" with Modbus protocol (remote command)

\* : parameter visible only with Modbus

# Parameter Index and Modbus addresses

Code	Page	Name	Unit	Modbus code and Adjustment Range (1)	Description	Modbus address	Factory setting	User setting
<i>F o r</i>	<u>62</u>	Modbus format	-	0 = <i>B o 1</i> 1 = <i>B E 1</i> 2 = <i>B n 1</i> 3 = <i>B n 2</i>	8 bit, odd parity, 1 stop bit 8 bit, even parity, 1 stop bit 8 bit, no parity, 1 stop bit 8 bit, no parity, 2 stop bit	82	<i>B E 1</i>	
Freq*		Frequency	Hz	-	-	265	-	
<i>G r d d</i>	<u>57</u>	Ground leakage current threshold	% of <i>I n</i>	<i>10</i> to <i>100</i> <i>10 1</i> = <i>o F F</i>	- Off	54	25 for S6 and S6U OFF for Q	
<i>G r d t</i>	<u>57</u>	Ground leakage current time delay	s	<i>1</i> to <i>60</i>	-	55	5	
<i>I c L</i>	<u>50</u>	Soft starter rated current	A	-	-	0	Read from the power card's serial EEPROM	
IG*		Integral gain	%	0 to 100%	This parameter is reserved for expert mode. Active when <i>S S C</i> = <i>0 n</i>	38	20	
<i>I L t</i>	<u>51</u>	Current limit	% of <i>I n</i>	200 to 700% max. value: 350% of <i>I c L</i>	-	17	350	
<i>I L t 2</i>	<u>55</u>	2nd current limit	% of <i>I n</i>	200 to 700% max. value: 350% of <i>I c L</i>	-	41	350	
<i>I n</i>	<u>50</u>	Motor rated current	A	0.4 <i>I c L</i> to <i>I c L</i>	-	3	According to the soft starter rating	
<i>I n 2</i>	<u>55</u>	2nd motor rated Current	A	0.4 <i>I c L</i> to <i>I c L</i>	-	44	According to the soft starter rating	
<i>I t H</i>	<u>59</u>	Overload protection	-	0 = <i>o F F</i> 1 = <i>r U n</i> 2 = <i>0 n</i>	off run on	63	On	
<i>L A C</i>	<u>50</u>	Advanced mode	-	0 = <i>o F F</i> 1 = <i>0 n</i>	off on	5	oFF	
<i>L C r 1</i>	<u>47</u>	LCr1		Phase 1 Current, Amp		257		
<i>L C r 2</i>	<u>47</u>	LCr2		Phase 2 Current, Amp		258		
<i>L C r 3</i>	<u>47</u>	LCr3		Phase 3 Current, Amp		259		
LED*		LEDS Status		d4: COMM LED (0=OFF,1=ON) d6: Ready LED (0=OFF,1=ON) d7: Run LED (0=OFF,1=ON). Flashing during soft start / soft stop. d8: Trip LED (0=OFF,1=ON) Note: other bits are reserved.		269		
<i>L F t</i>	<u>63</u>	Last trip	-	same as dEF1 to dEF9		279	-	

(1) Modbus code = Soft starter message

example : *o F F* on the soft starter will be equivalent to "0" with Modbus protocol (remote command)

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# Parameter Index and Modbus addresses

Code	Page	Name	Unit	Modbus code and Adjustment Range (1)	Description	Modbus address	Factory setting	User setting
LI*		Logical inputs		d0: Input 1. 0 – open, 1 – closed. d1: Input 2. d2: Input 3. d3...d15: Reserved		261		
<i>L 12</i>	<u>60</u>	Logic input 2	-	0 = <i>5 t r t</i> 1 = <i>r U n</i> 2 = <i>2 n d</i> 3 = <i>E t F</i> 4 = <i>r 5 t</i> 5 = <i>F A n</i> 6 = <i>F I</i> 7 = <i>L I L</i>	start:for a 3-wire control run:for a 2-wire control 2nd set of parameters external detected fault remote reset fan control trip inhibition forced local command	72	rUn	
<i>L 13</i>	<u>60</u>	Logic input 3	-	2 = <i>2 n d</i> 3 = <i>E t F</i> 4 = <i>r 5 t</i> 5 = <i>F A n</i> 6 = <i>F I</i> 7 = <i>L I L</i>	2nd set of parameters external detected fault remote reset fan control trip inhibition forced local command	73	rSt	
<i>L o</i>	<u>47</u>	Logic Output relays status		d0: Relay 1. 0 – not energized, 1 - energized d1: Relay 2 d2...d15: reserved		262		
<i>O 1 t</i>	<u>57</u>	Overcurrent time delay	s	0 to 50 s	5 with Modbus = 0.5s 50 with Modbus = 5.0s	51	0.5	
<i>O 1 d</i>	<u>56</u>	Overcurrent threshold	% of <i>I n</i>	100 to 300, by increment of 5	-	50	200	
<i>O 5 d</i>	<u>59</u>	Over voltage threshold	% of <i>U l n</i>	110 to 125	-	60	120	
<i>O 5 t</i>	<u>58</u>	Under voltage time delay	s	<i>1</i> to <i>10</i>	-	61	2	
PG*		Proportional gain	%	0 to 100%	This parameter is reserved for expert mode. Active when <i>5 5 C = 0 n</i>	37	60	
<i>P H L</i>	<u>58</u>	Phase loss detection	-	0 = <i>o F F</i> 1 = <i>0 n</i>	off on	57	On	
<i>P H r</i>	<u>57</u>	Phase sequence	-	0 = <i>1 2 3</i> 1 = <i>3 2 1</i> 2 = <i>o F F</i>	123 321 off	56	oFF	
<i>P t C</i>	<u>59</u>	PTC probes motor monitoring	-	0 = <i>o F F</i> 1 = <i>0 n</i>	off on	62	oFF	

(1) Modbus code = Soft starter message

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# Parameter Index and Modbus addresses

Code	Page	Name	Unit	Modbus code and Adjustment Range (1)	Description	Modbus address	Factory setting	User setting
<i>r 1</i>	<a href="#">61</a>	Relay 1	-	0 = <i>StPd</i> 1 = <i>nStP</i> 2 = <i>StPt</i> 3 = <i>rUn</i> 4 = <i>rdY</i> 5 = <i>trIP</i> 6 = <i>ALr</i>	stopped not stopped starting running ready trip alarm	74	nStP	
<i>r 2</i>	<a href="#">61</a>	Relay 2	-	as <i>r 1</i>	as <i>r 1</i>	75	trIP	
<i>r n t</i>	<a href="#">63</a>	Total run time	hours	-	-	273	-	
<i>r P r</i>	<a href="#">64</a>	Reset of trip history and counters	-	-	-	NA	-	
<i>S I C L</i>	<a href="#">63</a>	Last start maximum current	A	<i>0 to 999</i>	-	276	-	
<i>S L G</i>	<a href="#">53</a>	Starts period	min	<i>1 to 60</i>	-	33	30	
<i>S n b</i>	<a href="#">53</a>	Number of starts	-	<i>1 to 10</i> 11 = <i>oFF</i>	Number of starts off	32	oFF	
<i>S P C U</i>	<a href="#">54</a>	Start-stop profile control voltage	-	<i>0</i> <i>1</i> <i>2</i> <i>3</i>	0 1 2 3	36	0	
<i>S S C</i>	<a href="#">54</a>	Start-stop control	-	0 = <i>oFF</i> 1 = <i>On</i>	off on	35	On	
<i>S t n b</i>	<a href="#">63</a>	Total number of starts	-	-	-	274	-	
<i>S t P r</i>	<a href="#">63</a>	Last starting time	s	<i>0 to 999</i>	-	275	-	
<i>t 9 0</i>	<a href="#">51</a>	Initial voltage	%	10 to 50% of full voltage, by increment of 5	-	16	30%	
<i>t 9 2</i>	<a href="#">55</a>	2nd initial voltage	%	10 to 50% of full voltage <i>U In</i> , by increment of 5	-	40	30%	

(1) Modbus code = Soft starter message

example : *oFF* on the soft starter will be equivalent to "0" with Modbus protocol (remote command)

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# Parameter Index and Modbus addresses

Code	Page	Name	Unit	Modbus code and Adjustment Range (1)	Description	Modbus address	Factory setting	User setting
<i>Ebr</i>	<a href="#">62</a>	Modbus baudrate	Kbps	0 = <i>4.8</i> 1 = <i>9.6</i> 2 = <i>19.2</i>	-	81	19.2	
<i>ESt</i>	<a href="#">64</a>	Soft starter self test	-	on off	on off	NA	-	
<i>HP</i>	<a href="#">52</a>	Motor thermal protection	-	1 = <i>10</i> 2 = <i>20</i> 3 = <i>30</i>	class 10 class 20 class 30 (heavy duty)	22	10	
<i>LS</i>	<a href="#">51</a>	Max start time	s	<i>1 to 250</i>	-	18	15	
<i>TO</i>	<a href="#">62</a>	Modbus time out	s	1 = <i>0.1</i> to 600 = <i>60.0</i>	1 with Modbus = 0.1s 600 with Modbus = 60.0s	83	5.0	
<i>Ubd</i>	<a href="#">57</a>	Unbalance threshold	% of <i>In</i>	101 = <i>oFF</i> 10 to 100%	-	52	25	
<i>Ubt</i>	<a href="#">57</a>	Unbalance time delay	s	<i>1 to 60</i>	-	53	10	
<i>UDP</i>	<a href="#">64</a>	Soft starter software version	-	<i>0000 to 9999</i>	-	317		
<i>UId</i>	<a href="#">56</a>	Under current threshold	% of <i>In</i>	0 = <i>oFF</i> 20 to 90% of <i>In</i>	-	48	oFF	
<i>UIn</i>	<a href="#">50</a>	Line voltage	V	Q range: 200 to 440 S6-S6U ranges: 200 to 600	-	2	Q range: 400 S6-S6U ranges: 480	
<i>UIt</i>	<a href="#">56</a>	Under current time delay	s	<i>1 to 40</i>	-	49	10	
<i>USt</i>	<a href="#">58</a>	Under voltage threshold	% of <i>In</i>	50 to 90% of <i>UIn</i>	-	58	70	
<i>USt</i>	<a href="#">58</a>	Under voltage time delay	s	<i>1 to 10</i>	-	59	5	
Voltage*		Voltage	V	Line voltage, volts		260		

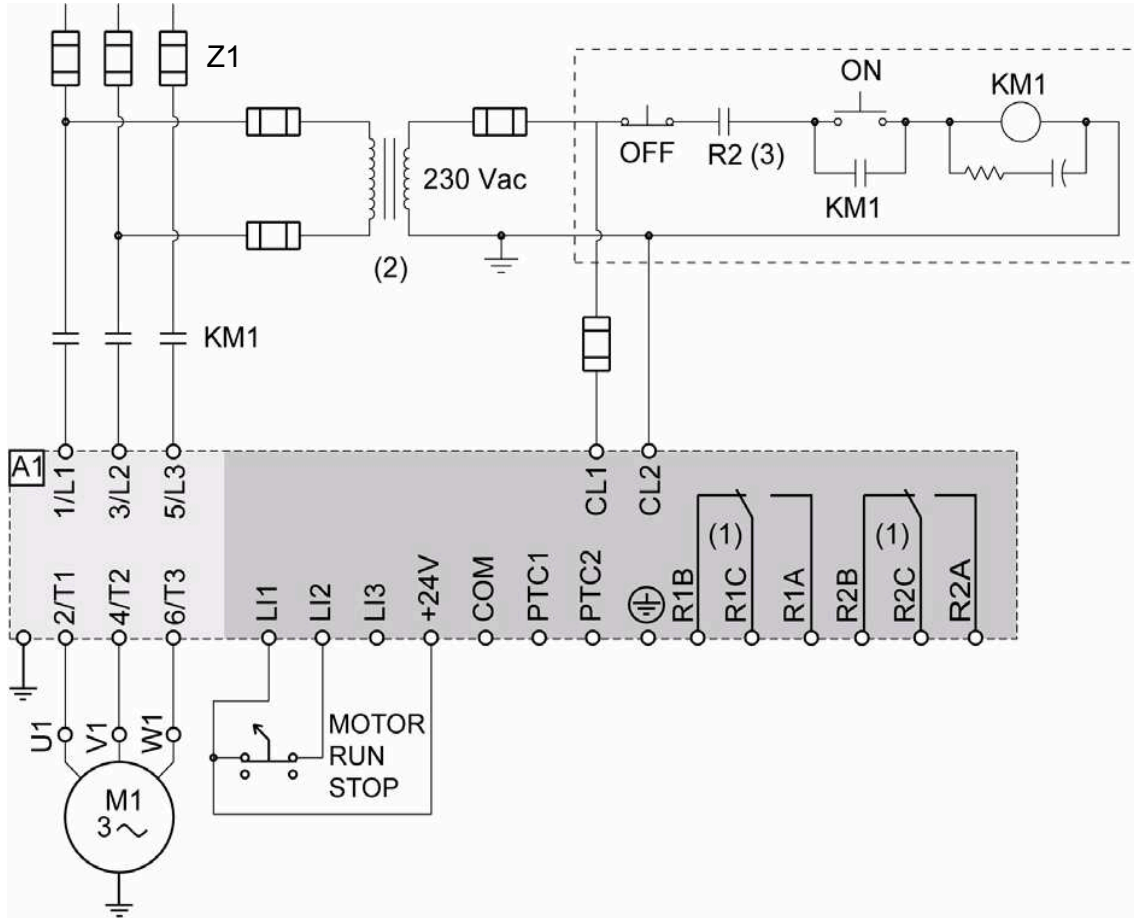
(1) Modbus code = Soft starter message

example : *oFF* on the soft starter will be equivalent to "0" with Modbus protocol (remote command)

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# Annex 1: UL508 schematics

## ATS22...Q or ATS22...S6: 230 V, 2-wire control, freewheel stop



- (1) Check the operating limits of the contact, for example when connecting to high rating contactors. See "Electrical characteristics" page [35](#).
- (2) Insert a voltage transformer if the power voltage is higher than the Altistart 22 acceptable value. Characteristics: min 100 VA page [13](#).

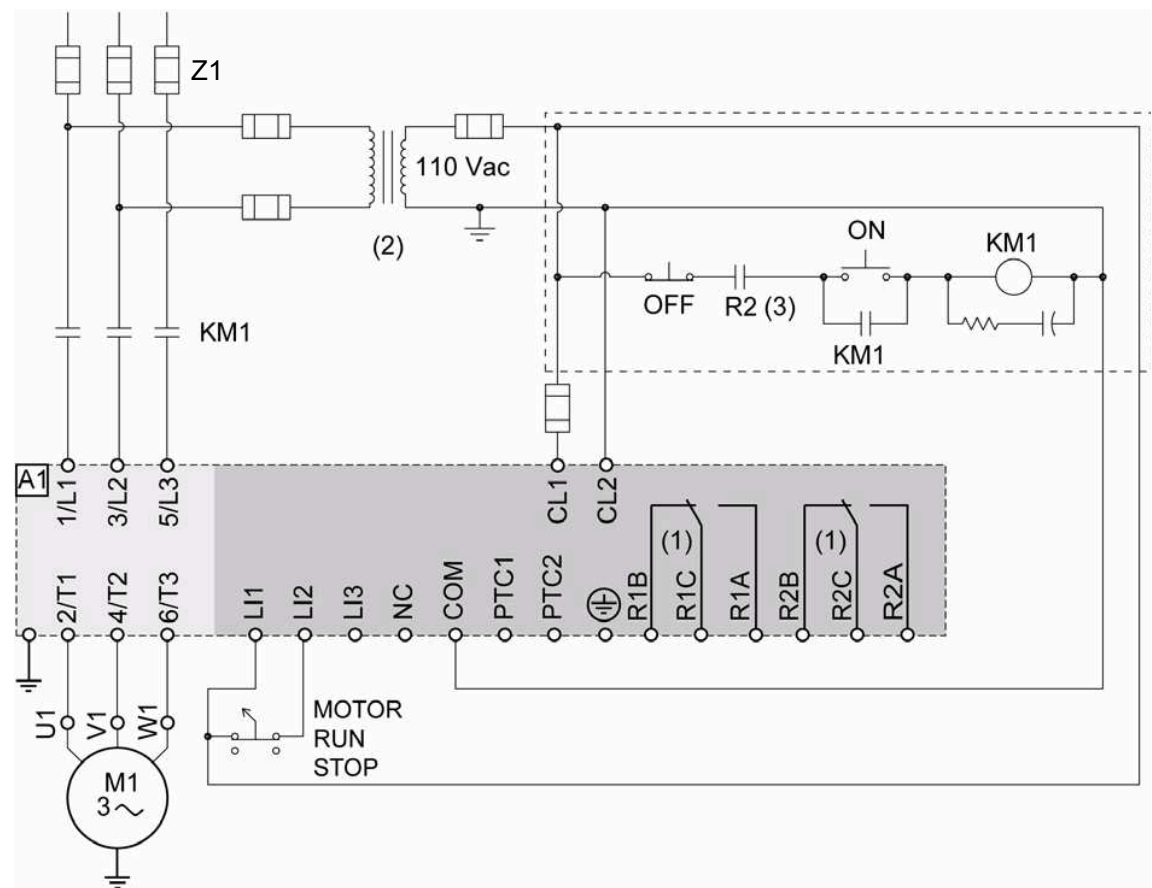
### 2-wire control setting

In the menu Advanced I/O **ID**, set the following parameters:

Parameter	Value	Description
<b>L 12</b>	<b>r Un</b>	Logic Input 2 is set to Run
<b>r 2</b>	<b>t r IP</b>	Trip relay is de-energized upon trip

# Annex 1: UL508 schematics

## ATS22...S6U: 110V, 2-wire control, freewheel stop



- (1) Check the operating limits of the contact, for example when connecting to high rating contactors. See "Electrical characteristics" page [36](#).
- (2) Insert a voltage transformer if the power voltage is higher than the Altistart 22 acceptable value. Characteristics: min 100 VA page [13](#).

### 2-wire control setting

In the menu Advanced I/O **IO**, set the following parameters:

Parameter	Value	Description
<b>L I 2</b>	<b>r Un</b>	Logic Input 2 is set to Run
<b>r 2</b>	<b>t r IP</b>	Trip relay is denegerized upon trip

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