

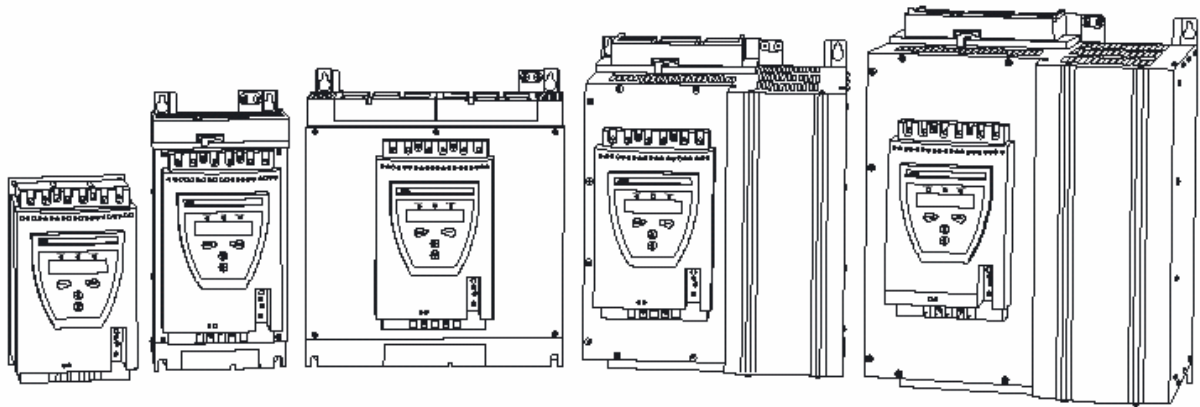
Softstarters

Type PST/PSTB

Fieldbus communication

Modbus for PST sw CU 04.00.02

1SFC132043M0201
January 2007



The ABB logo, consisting of the letters 'ABB' in a bold, stylized, sans-serif font.

Modbus

The Modbus protocol are fieldbus protocols that provides full control and status information of the softstarter as well as writing of parameters. Through the fieldbus it is possible to start and stop the motor, perform jog, sequence start, read out currents and frequency, achieve information about protections, warnings, faults and much more. See chapter “Setting and configuration” in the installation manual for programming of the inputs / outputs.

Before the Modbus fieldbus can be taken in operation following parameters must be set in the softstarter:

- Parameter *Fieldbus Ctrl* set to Yes
- Parameter *Fieldbus Type* set to other
- Parameter *Fieldbus Addr* set to a free communication address.

For technical data and descriptions of the Modbus fieldbus plug, see document 2CDC194001D0201 available at www.abb.com/lowvoltage .

Note that the set-up varies depending on used softstarter version and this document describes the softstarter software version CU 04.00.02 which can be checked in the softstarter display Menu -> STATUS INFORMATION -> SW Ver CU xx.xx.xx.. Please check which is the actual softstarter version in your case.



Caution!

The motor may start unexpectedly if there is a start signal present when doing any of the actions listed below.

- *Switching from one type of control to another (fieldbus control / hardwire control)*
- *Re-programming of the programmable inputs*
- *Reset all Settings (programmable input set to Enable)*

Binary input telegram
To PLC from Softstarter.

| Word in input data area | Binary input byte | Bit | Data | Description | |
|-------------------------|-------------------|---------------|---------------------------------|---------------------------------|--------------------------------------|
| 0 | 0 | 0 | K4 relay output | Status of K4 | |
| | | 1 | K5 relay output | Status of K5 | |
| | | 2 | K6 relay output | Status of K6 | |
| | | 3 | V7 Programmable software output | Status of V7 | |
| | | 4 | Start Input | Status of Start Input | |
| | | 5 | Stop Input | Status of Stop Input | |
| | | 6 | In0 Input | Status of In0 | |
| | 7 | In1 Input | Status of In1 | | |
| | 1 | 1 | 8 (0) | Run | Run Status |
| | | | 9 (1) | Top Of Ramp | Top Of Ramp Status |
| | | | 10 (2) | Line or Inside Delta connection | 0 = Line, 1 = Delta |
| | | | 11 (3) | Phase sequence | 0 = L1,L2,L3 1=L1,L3,L2 |
| | | | 12 (4) | Prot Motor OL | Event Status |
| | | | 13 (5) | Prot Locked Rot | Event Status |
| | | | 14 (6) | Prot Underload | Event Status |
| 15 (7) | | | Prot Phase Imb | Event Status | |
| 1 | 2 | 0 | Prot High I | Event Status | |
| | | 1 | Prot Phase Rev | Event Status | |
| | | 2 | Prot PTC | Event Status | |
| | | 3 | Dummy | | |
| | | 4 | Prot SCR OL | Event Status | |
| | | 5 | Warn OL | Event Status | |
| | | 6 | Warn SCR OL | Event Status | |
| | 3 | 3 | 7 | Warn I=High | Event Status |
| | | | 8 (0) | Warn I=Low | Event Status |
| | | | 9 (1) | Fault (general signal) | Event Status, general for all faults |
| | | | 10 (2) | Fault Phase Loss | Event Status |
| | | | 11 (3) | Fault SC SCR | Event Status |
| | | | 12 (4) | Fault Open SCR | Event Status |
| | | | 13 (5) | Fault Wrong Freq | Event Status |
| | | | 14 (6) | Fault Connection | Event Status |
| 2 | 4 | 15 (7) | Fault Internal | Event Status | |
| | | 0 | Fault FB Timeout | Event Status | |
| | | 1 | Fault HS Temp | Event Status | |
| | | 2 | Fault Line side | Event Status | |
| | | 3 | Fault BP closed | Event Status | |
| | | 4 | Fault BP open | Event Status | |
| | | 5 | Dummy | | |
| | 5 | 5 | 6 | Shunt Fault | Event Status |
| | | | 7 | Spare (Value = 0) | |
| | | | 8 (0) | Spare (Value = 0) | |
| | | | 9 (1) | Spare (Value = 0) | |
| | | | 10 (2) | Spare (Value = 0) | |
| | | | 11 (3) | Spare (Value = 0) | |
| | | | 12 (4) | Spare (Value = 0) | |
| | | | 13 (5) | Spare (Value = 0) | |
| | | 14 (6) | Spare (Value = 0) | | |
| | | 15 (7) | Spare (Value = 0) | | |

Analogue input telegram

To PLC from Softstarter.

All analogue data will be represented as 16 bit values.

| Word in input data area | Analogue input word | Data | Representation |
|-------------------------|---------------------|----------------------|--------------------------|
| 3 | 0 | Phase current L1 *) | Value =1000 ⇒ 1000A |
| 4 | 1 | Phase current L2 *) | Value =1000 ⇒ 1000A |
| 5 | 2 | Phase current L3 *) | Value =1000 ⇒ 1000A |
| 6 | 3 | Max phase current *) | Value =1000 ⇒ 1000A |
| 7 | 4 | Measured frequency | Value =100 ⇒ 100Hz |
| 8 | 5 | Output voltage | Value =100 ⇒ 100% |
| 9 | 6 | Calc. Motor temp. | Value =100 ⇒ 100% |
| 10 | 7 | Counted no of Starts | Value =100 ⇒ 10000 times |
| 11 | 8 | Run Time | Value =100 ⇒ 1000 hours |

*) Phase current L1, L2 and L3 indicates the current through the softstarter while the Max phase current always is the line current.

Diagnostic inputs

There are 3 channels available for fieldbus related diagnostic messages. Each channel consists of two bytes with an error code and the parameter number that caused the error. The latest error is stored in channel 1, the second latest in channel 2 and the third latest in channel 3. The binary output bit “reset active diagnostics” is used to clear the diagnostic area.

Error Codes: 1 = Parameter Value out of range
 2 = Invalid parameter No
 3 = Write of parameter when fieldbus control isn't enabled

| Word in input data area | Diagnostic input word | Error Code | Parameter No. |
|-------------------------|-----------------------|------------------------------|--------------------------------|
| 12 | 0 | Diagn. Channel 1, Error Code | Diagn. Channel 1, Parameter No |
| 13 | 1 | Diagn. Channel 2, Error Code | Diagn. Channel 2, Parameter No |
| 14 | 2 | Diagn. Channel 3, Error Code | Diagn. Channel 3, Parameter No |

Binary output telegram

From PLC to Softstarter.

| Word in output data area | Binary output byte | Bit | Data | Description |
|--------------------------|--------------------|---------------|--|---|
| 0 | 0 | 0 | Start (1 st par set if Seq.start) | Commence a start when signal is set. Start1 if sequence start. |
| | | 1 | Stop | Commence a stop when signal is negated. |
| | | 2 | Reset Events | Reset signal for possible events. |
| | | 3 | Enable | Enable, this bit must be set for running the motor |
| | | 4 | Jog | Perform Jog when signal is set. |
| | | 5 | DOL start | Perform DOL start when signal is set. |
| | | 6 | Start2 (2 nd par set Seq.start) | Start2 if sequence start. |
| | | 7 | Start3 (3 rd par set Seq.start) | Start3 if sequence start. |
| 1 | 1 | 8 (0) | Time synchronisation | Time synchronisation signal that is used to synchronise the local real time clock with the time given as an analogue input telegram to the softstarter. If the signal is "1" and there is a difference between the times the local real time clock is synchronised. |
| | | 9 (1) | Reset active diagnostics | When set to "1" this will reset the fieldbus diagnostic area |
| | | 10 (2) | Spare | |
| | | 11 (3) | Spare | |
| | | 12 (4) | Spare | |
| | | 13 (5) | Spare | |
| | | 14 (6) | Spare | |
| | | 15 (7) | Spare | |

Analogue output telegram

From PLC to Softstarter.

All analogue data will be represented as 16 bit values.

| Word in output data area | Analogue output word | Data | Representation |
|--------------------------|----------------------|---------|-------------------------------|
| 1 | 0 | Year | Value = 2003 ⇒ Year 2003 |
| 2 | 1 | Month | Value = 12 ⇒ December |
| 3 | 2 | Day | Value = 31 ⇒ 31 st |
| 4 | 3 | Hour | Value = 23 ⇒ 23 h |
| 5 | 4 | Minutes | Value = 59 ⇒ 59 min |
| 6 | 5 | Seconds | Value = 59 ⇒ 59 sec |

The output data is used to synchronize the softstarter real time clock with a possible system clock, it is used together with the binary output time synchronisation signal, if this signal is set to “1” and there is a difference between the clocks the local softstarter clock will be synchronised with the analogue outputs.

Input address map

| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----|------------------------------|----|----|----|----|----|---|---|--------------------------------|---|---|---|---|---|---|---|
| 0 | Binary In, Byte 1 | | | | | | | | Binary In, Byte 0 | | | | | | | |
| 1 | Binary In, Byte 3 | | | | | | | | Binary In, Byte 2 | | | | | | | |
| 2 | Binary In, Byte 5 | | | | | | | | Binary In, Byte 4 | | | | | | | |
| 3 | Analogue In, Word 0 | | | | | | | | | | | | | | | |
| 4 | Analogue In, Word 1 | | | | | | | | | | | | | | | |
| 5 | Analogue In, Word 2 | | | | | | | | | | | | | | | |
| 6 | Analogue In, Word 3 | | | | | | | | | | | | | | | |
| 7 | Analogue In, Word 4 | | | | | | | | | | | | | | | |
| 8 | Analogue In, Word 5 | | | | | | | | | | | | | | | |
| 9 | Analogue In, Word 6 | | | | | | | | | | | | | | | |
| 10 | Analogue In, Word 7 | | | | | | | | | | | | | | | |
| 11 | Analogue In, Word 8 | | | | | | | | | | | | | | | |
| 12 | Diagn. Channel 1, Error Code | | | | | | | | Diagn. Channel 1, Parameter No | | | | | | | |
| 13 | Diagn. Channel 2, Error Code | | | | | | | | Diagn. Channel 2, Parameter No | | | | | | | |
| 14 | Diagn. Channel 3, Error Code | | | | | | | | Diagn. Channel 3, Parameter No | | | | | | | |

Output address map

| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|----------------------|----|----|----|----|----|---|---|--------------------|---|---|---|---|---|---|---|
| 0 | Binary Out, Byte 1 | | | | | | | | Binary Out, Byte 0 | | | | | | | |
| 1 | Analogue Out, Word 0 | | | | | | | | | | | | | | | |
| 2 | Analogue Out, Word 1 | | | | | | | | | | | | | | | |
| 3 | Analogue Out, Word 2 | | | | | | | | | | | | | | | |
| 4 | Analogue Out, Word 3 | | | | | | | | | | | | | | | |
| 5 | Analogue Out, Word 4 | | | | | | | | | | | | | | | |
| 6 | Analogue Out, Word 5 | | | | | | | | | | | | | | | |

Parameters –

For this implementation all parameter values (both binary and analogue) are represented as 16 bits.

When programming high bytes shall come before low bytes.

Parameters where it is said Type Read, can not be read from the PLC (Not possible with Modbus)

| No | | Type | Parameter | Description | Range | Unit | Default |
|----|--|-------|--------------|---|-------------------------------|------|-----------------|
| 1 | | Write | Setting Ie | Setting current | 0 – 3000 (*) | Amp | Individual 1 |
| 2 | | Write | Start Ramp | Time for start ramp | 1 – 120 | Sec | 10 |
| 3 | | Write | Stop Ramp | Time for stop ramp | 0 – 120 | Sec | 0 |
| 4 | | Write | Init Volt | Initial voltage for start ramp | 30 – 70 | % | 30 |
| 5 | | Write | End Volt | End voltage for stop ramp | 30 – 70 | % | 30 |
| 6 | | Write | Step Down | Voltage value to which the softstarter shall step down at stop and where it shall commence the stop ramp. | 30 – 100 | % | 100 |
| 7 | | Write | Current Lim | Level of the current limit. | 20 – 70 = 2,0 – 7,0 | xIe | 40 |
| 8 | | Write | Kick Start | Selection of Kick start | 0=No, 1=Yes | | 0 |
| 9 | | Write | Kick Level | Level of Kick start if selected | 50 – 100 | % | 50 |
| 10 | | Write | Kick Time | Time for Kick start if selected | 1 – 15 = 0,1 – 1,5 | Sec | 2 |
| 11 | | Write | Start Range | Selectable range for start ramp | 0=1-30, 1=1-120 | Sec | 0 |
| 12 | | Write | Stop Range | Selectable range for stop ramp | 0=1-30, 1=1-120 | Sec | 0 |
| 13 | | Write | Overload | Overload protection | 0=No, 1=Normal, 2=Dual | | 1 |
| 14 | | Write | OL Class | Overload Class | 0=10A, 1=10, 2= 20, 3= 30 | | 1 |
| 15 | | Write | OL Class S | Overload Class, Dual type, Start Class | 0=10A, 1=10, 2= 20, 3= 30 | | 1 |
| 16 | | Write | OL Class R | Overload Class, Dual type, Run Class | 0=10A, 1=10, 2= 20, 3= 30 | | 1 |
| 17 | | Write | OL Op | Type of operation for overload protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 18 | | Write | Locked Rotor | Locked rotor protection | 0=No, 1=Yes | | 0 |
| 19 | | Write | Lock R Lev | Trip level for locked rotor protection | 5 – 80 = 0,5 – 8,0 | xIe | 40 |
| 20 | | Write | Lock R Time | Trip time for locked rotor protection | 20 – 100 = 0,2 – 10,0 | Sec | 10 |
| 21 | | Write | Lock R Op | Type of operation for locked rotor protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 22 | | Write | Underload | Underload protection | 0 = No, 1 = Yes | | 0 |
| 23 | | Write | Underl Lev | Trip level for Underload protection | 4 - 8 = 0,4 – 0,8 | xIe | 5 |
| 24 | | Write | Underl Time | Trip time for Underload protection | 1 – 30 | Sec | 10 |
| 25 | | Write | Underl Op | Type of operation for Underload protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 26 | | Write | Phase Imb | Phase imbalance protection | 0 = No, 1 = Yes | | 0 |
| 27 | | Write | Ph Imb Lev | Trip level for phase imbalance protection | 10 – 80 | % | 80 |
| 28 | | Write | Ph Imb Op | Type of operation for phase imbalance protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 29 | | Write | High I | High current protection | 0 = No, 1 = Yes | | 0 |
| 30 | | Write | High I Op | Type of operation for high current protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 31 | | Write | Phase Rev | Phase reversal protection | 0 = No, 1 = Yes | | 0 |
| 32 | | Write | Ph Rev Op | Type of operation for phase reversal protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 33 | | Write | PTC | PTC protection | 0 = No, 1 = Yes | | 0 |
| 34 | | Write | PTC Op | Type of operation for PTC protection | 0=Stop-M, 1=Stop-A, 2= Ind | | 0 |
| 35 | | Write | Ext ByPass | External By-pass contactor is used | 0=No, 1=Yes | | 0 |
| 36 | | Read | Dummy 36 | Spare parameter | 0 | | 0 |
| 37 | | Write | Warn I=High | High current warning | 0=No, 1=Yes | | 0 |
| 38 | | Write | Wa I=H Lev | Trip level for high current warning | 5 – 50 = 0,5 – 5,0 | xIe | 12 |

| No | | Type | Parameter | Description | Range | Unit | Default |
|----|--|-------|-------------|---|--|------|-----------------|
| 39 | | Write | Warn I=Low | Low current warning | 0=No, 1=Yes | | 0 |
| 40 | | Write | Wa I=L Lev | Trip level for low current warning | 4 – 10 = 0,4 – 1,0 | xIe | 8 |
| 41 | | Write | Warn OL | Overload warning | 0=No, 1=Yes | | 0 |
| 42 | | Write | Wa OL Lev | Trip level for overload warning | 40 – 99 | % | 90 |
| 43 | | Write | Warn SCR OL | Thyristor overload warning | 0=No, 1=Yes | | 0 |
| 44 | | Write | Ph Loss Op | Type of operation for phase loss fault | 0=Stop-M, 1=Stop-A | | 0 |
| 45 | | Write | FB Fault Op | Type of operation for fieldbus fault | 0=Stop-M, 1=Stop-A | | 0 |
| 46 | | Write | Freq F Op. | Type of operation for frequency fault | 0=Stop-M, 1=Stop-A | | 0 |
| 47 | | Write | HS Temp Op | Type of operation for heat sink over temperature fault | 0=Stop-M, 1=Stop-A | | 0 |
| 48 | | Write | SCR SC Op | Type of operation for thyristor short circuit fault | 0=Stop-M, 1=Stop-A | | 0 |
| 49 | | Read | In0 | Function of programmable input In0 | 0=None, 1=Reset, 2=Enable, 3=Jog, 4=DOL-on, 5=Start2, 6=FB-Dis | | 1 |
| 50 | | Read | In1 | Function of programmable input In1 | 0=None, 1=Reset, 2=Enable, 3=Jog, 4=DOL-on, 5=Start2, 6=FB-Dis | | 1 |
| 51 | | Write | Relay K4 | Function of programmable relay output K4 | 0=Run, 1=TOR, 2=Event | | 0 |
| 52 | | Write | Relay K5 | Function of programmable relay output K5 | 0=Run, 1=TOR, 2=Event | | 1 |
| 53 | | Write | Relay K6 | Function of programmable relay output K6 | 0=Run, 1=TOR, 2=Event | | 2 |
| 54 | | Write | SW Outp V7 | Function of programmable software output V7 | 0=Run, 1=TOR, 2=Event | | 2 |
| 55 | | Write | Event K4 | Different events to include for signalling with K4 if “Event” is selected | 0 – 65535, Bit mask see separate description. | | 0 |
| 56 | | Write | Event K5 | Different events to include for signalling with K5 if “Event” is selected | 0 – 65535, Bit mask see separate description. | | 0 |
| 57 | | Write | Event K6 | Different events to include for signalling with K6 if “Event” is selected | 0 – 65535, Bit mask see separate description. | | 7 |
| 58 | | Write | Event V7 | Different events to include for signalling with V7 if “Event” is selected | 0 – 65535, Bit mask see separate description. | | 7 |
| 59 | | Read | Fieldb Ctrl | Control of the softstarter with fieldbus | 0=No, 1=Yes | | 0 |
| 60 | | Read | Fieldb Type | Type of fieldbus | 0=AS-Int, 1=Other | | 1 |
| 61 | | Read | Fieldb Addr | Fieldbus address | 0 – 1000 | | 0 |
| 62 | | Write | No of Seq | Number of sequences for sequence start. | 1=No, 2=2, 3=3 | | 1 |
| 63 | | Write | Start Ramp1 | 1 st sequence, time for start ramp | 1 – 120 | Sec | 10 |
| 64 | | Write | Init Volt1 | 1 st sequence, initial voltage for start ramp | 30 – 70 | % | 30 |
| 65 | | Write | Curr Lim1 | 1 st sequence, current limit | 20 – 70 = 2,0 – 7,0 | xIe | 4 |
| 66 | | Write | 1st Set Ie | 1 st sequence, motor rated current | 0 – 3000 (*) | Amp | Individual 1 |
| 67 | | Write | Start Ramp2 | 2 nd sequence, time for start ramp | 1 – 120 | Sec | 10 |
| 68 | | Write | Init Volt2 | 2 nd sequence, initial voltage for start ramp | 30 – 70 | % | 30 |
| 69 | | Write | Curr Lim2 | 2 nd sequence, current limit | 20 – 70 = 2,0 – 7,0 | xIe | 40 |
| 70 | | Write | 2nd Set Ie | 2 nd sequence, motor rated current | 0 – 3000 (*) | Amp | Individual 1 |
| 71 | | Write | Start Ramp3 | 3 rd sequence, time for start ramp | 1 – 120 | Sec | 10 |
| 72 | | Write | Init Volt3 | 3 rd sequence, initial voltage for start ramp | 30 – 70 | % | 30 |
| 73 | | Write | Curr Lim3 | 3 rd sequence, current limit | 20 – 70 = 2,0 – 7,0 | xIe | 40 |
| 74 | | Write | 3rd Set Ie | 3 rd sequence, motor rated current | 0 – 3000 (*) | Amp | Individual 1 |
| 75 | | Read | Language | Language to use on display | 1=US/UK, 2=FI, 3=SE, 4=PT, 5=NL, 6=IT, 7=FR, 8=ES, | | Individual 1 |

| No | | Type | Parameter | Description | Range | Unit | Default |
|-----|--|-------|--------------|---|---------------------------|---------|---------------------------------------|
| | | | | | 9=DE, 10=CN, 11=RU, 12=TR | | |
| 76 | | Read | Dummy 76 | Spare parameter | 0 | | 0 |
| 77 | | Read | LCD Auto Off | Time for display automatic turn off | 1 – 255 | Minutes | 15 |
| 78 | | Read | Password | Password for display | 0=No, 1 – 255=1- 255 | | 0 |
| 79 | | Read | Date Type | Type of date presentation | 0=ISO , 1=CE , 2=US | | 0 |
| 80 | | Read | Date Year | Year | 1901 – 2038 | | Individual 1 |
| 81 | | Read | Date Month | Month | 1 – 12 | | Individual 1 |
| 82 | | Read | Date Day | Day | 1 – 31 | | Individual 1 |
| 83 | | Read | Time Hour | Hour | 0 – 23 | | Individual 1 |
| 84 | | Read | Time Min | Minutes | 0 – 59 | | Individual 1 |
| 85 | | Read | S Port Ctrl | Serial port control | 0=No, 1=Yes | | 0 |
| 86 | | Read | S Port Addr1 | Address of service port 1 st group | 0 – 255 | | 192 |
| 87 | | Read | S Port Addr2 | Address of service port 2 nd group | 0 – 255 | | 168 |
| 88 | | Read | S Port Addr3 | Address of service port 3 rd group | 0 – 255 | | 0 |
| 89 | | Read | S Port Addr4 | Address of service port 4 th group | 0 – 255 | | 2 |
| 90 | | Read | CT Ratio Ir | Ratio of current transformers | 0 – 2500 | | Individual 1 |
| 91 | | Read | Int ByPass | Built in by-pass contactor | 0=No, 1=Yes | | 0 for all PST 1 for all PSTB |
| 92 | | Read | ByPass AC3 | AC3 value of built in by-pass contactor | 0 – 2500 | Amp | Individual 1 |
| 93 | | Read | SOP1 | Thyristor Parameter 1 | 7 – 12 = 0,7 – 1,2 | | Individual 1 |
| 94 | | Read | SOP2 | Thyristor Parameter 2 | 5 – 2000 = 0,05 – 20,00 | | Individual 1 |
| 95 | | Read | SOP3 | Thyristor Parameter 3 | 11 – 1200 = 0,011 – 1,200 | | Individual 1 |
| 96 | | Read | SOP4 | Thyristor Parameter 4 | 10 – 200 = 1,0 – 20,0 | | Individual 1 |
| 97 | | Write | BP Closed Op | Type of operation for by-pass doesn't open | 0=Stop-M, 1=Stop-A | | 0 |
| 98 | | Write | BP Open Op | Type of operation for by-pass doesn't close | 0=Stop-M, 1=Stop-A | | 0 |
| 99 | | Read | Dummy 99 | Spare parameter | 0 | | 0 |
| 100 | | Read | FCODE1 | Factory code 1 | 0-10 | | 0 |
| 101 | | Read | FCODE2 | Factory code 2 | 0-10 | | 0 |
| 102 | | Read | FCODE3 | Factory code 3 | 0-10 | | 0 |
| 103 | | Read | FCODE4 | Factory code 4 | 0-10 | | 0 |
| 104 | | Read | FCODE5 | Factory code 5 | 0-100 | | 0 |
| 105 | | Read | FCODE6 | Factory code 6 | 0-100 | | 0 |
| 106 | | Read | PST(B) | PST(B) size | 1-2500 | Amp | Individual 1 |
| 107 | | Read | FCODE7 | Factory code 7 | 0=No, 1=Yes | | 1 |
| 108 | | Read | FCODE8 | Factory code 8 | 0=No, 1=Yes | | 1 |
| 109 | | Read | FCODE9 | Factory code 9 | 0=No, 1=Yes | | 1 |
| 110 | | Read | FCODE10 | Factory code 10 | 0-25 | | 14 |
| 111 | | Write | C Lim Y Time | Time for dual current limit | 0-120 | Sec | 0 |
| 112 | | Write | C Lim Y Lev | Level for dual current limit | 20-70 = 2,0-7,0 | xIe | 40 |
| 113 | | Write | FB Auto Dis | Fieldbus autodisable | 0=No, 1=Yes | | 0 |

*) For the purpose of having one common data for the whole range of softstarters “Setting Ie”, “1st Set Ie”, “2nd Set Ie” and “3rd Set Ie” have the range 0 – 3000 Amp. The softstarter in itself will have a much more narrow range defined by its rated current and only values within the softstarters range will be accepted, other

values will be skipped. The valid range per type is shown in the softstarter catalogue or on the softstarter front label (marking plate).

| 16 Bit Mask for Events on Relay outputs | |
|--|--------------|
| Bit 0 | Overload |
| Bit 1 | Fault |
| Bit 2 | High I |
| Bit 3 | SCR OL |
| Bit 4 | Locked Rotor |
| Bit 5 | Underload |
| Bit 6 | Phase Imb |
| Bit 7 | PTC |
| Bit 8 | Phase Rev |
| Bit 9 | Warn OL |
| Bit 10 | Warn SCR OL |
| Bit 11 | Warn I=High |
| Bit 12 | Warn I=Low |
| Bit 13 | Shunt Fault |
| Bit 14 | Spare |
| Bit 15 | Spare |

Example for a set up.

Softstarter PST Modbus RTU communication.

This document describes an application example between a Modbus RTU master (PLC CPU, PC, etc.) and the ABB softstarter PST equipped with a modbus fieldbus plug. Please always use the actual softstarter and FBP manuals.

In this particular example following documents has been used:

Modbus RTU FBP FielBusPlug MRP21. FBP technical description 2CDC194001D0201.

Softstarters PST installation and commissioning manual 1 SFC132003M0201, Jan 2005

Softstarter software version: **SW Ver CU 04.00.02**

For other versions of software RED marked figures in this example will change

Softstarter settings

1. Set the softstarter address and field bus communication.

Change the default address 248 of the softstarter with the keypad to 47 (Fieldb Addr) and enable the fieldbus communication (Fieldb Ctrl=Yes).

2. Set the communication parameters.

The communication parameters are: 1 Start bit, 8 Data bits, the Parity will be adapted to the master. The baud rate is mapped to the slave address, e.g. : the baud rate to the slave 47 is 19200. Therefore the master and the slave will have the communication parameters:

1 start bit, 1 stop bit, 8 data bit, even parity, 19200 baud

Data exchange with the Modbus RTU master

Step1

Without receiving the configuration data the softstarter is not responding to the request telegrams of the Master (LED H2 on the FBP is blinking).

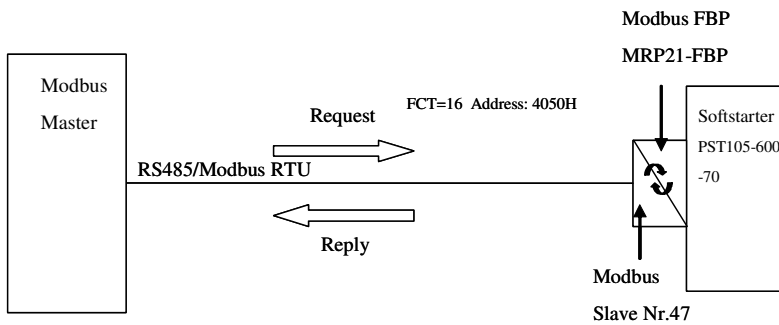
Send configuration data to the softstarter (Number of I/O , number of parameters, etc.).

After the configuration the softstarter will be a regular Modbus slave (LED H2 is off) and will respond to the polling telegrams of the master.

Step 2

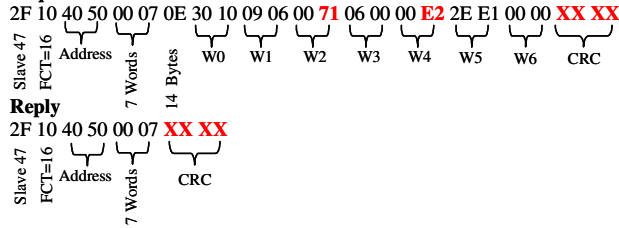
Now the master can send different Modbus telegrams in order to exchange data with the Softstarter.

Write configuration data

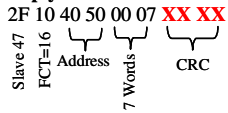


FCT, Address and Number Words are fixed!

Request

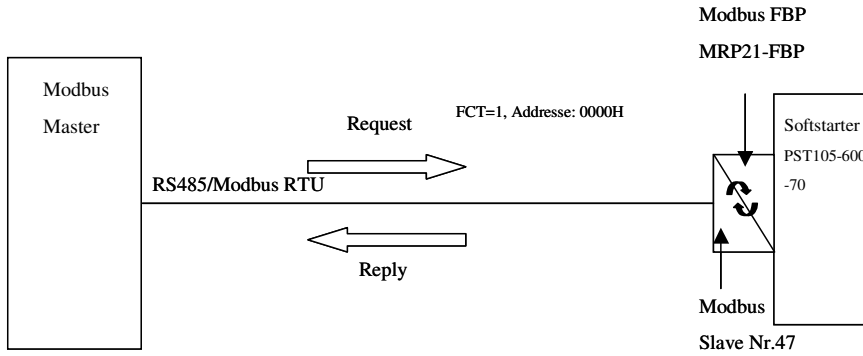


Reply



- W0 HB** : number of binary inputs (30H = 48D)
- W0 LB** : number of binary outputs (10H = 16D)
- W1 HB** : number of analog inputs (09H = 09D)
- W1 LB** : number of analog outputs (06H= 06D)
- W2** : number of parameters (**71H = 113D**)
- W3 HB** : number of diagnosis-bytes (06H = 06D)
- W3 LB** : not used
- W4** : number of parameters bytes (**E2H = 226D**)
- W5** : product Code (2EE1H = 12001D)
- W6** : bus timeout (00)

Read binary input telegram



e.g.: read 48 bit starting at the address 0000

Request

2F 01 00 00 00 30 3A 50

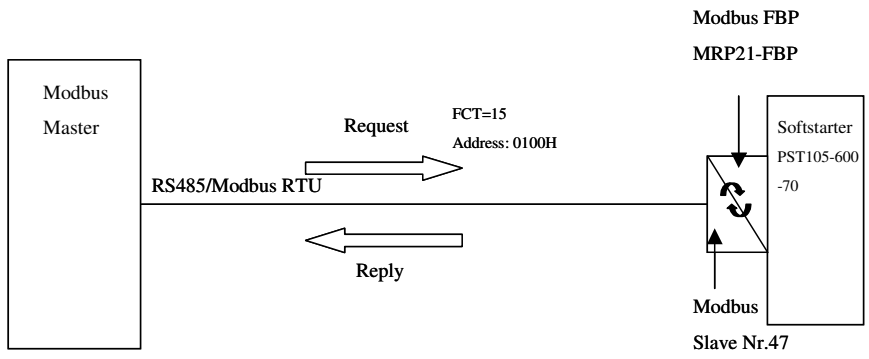
Slave 47
FCT=01
Address 48 bit CRC

Reply

2F 01 06 00 00 00 00 00 00 00 00 00 00 00 75 0D

Slave 47
FCT=15
6 Byte
Byte 0 Byte 1 Byte 2 Byte 3 Byte 4 Byte 5 CRC

Write binary output telegram



e.g.: write 16 bit starting at the address 0100

Request

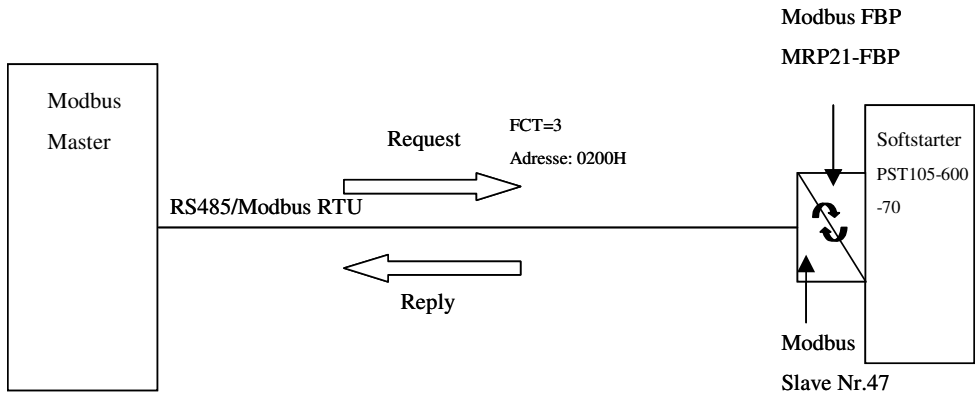
2F 0F 01 00 00 10 02 00 00 27 41
 Slave 47 FCT=15 Address 16 bit 2 Byte Output CRC

Reply

2F 0F 01 00 00 10 53 B5
 Slave 47 FCT=15 Address 16 bit CRC

- B0** : Start 1
- B1** : Stop
- B2** : Reset Event
- B3** : Enable
- B4** : Jog
- B5** : DOL Start
- B6** : Start 2
- B7** : Start 3
- B8** : Time-synchronise
- B9** : Reset Diagnosis
- B10-B15** : Reserve

Read analogue input telegram



e.g.: read 9 words starting at the address 0200H

Request

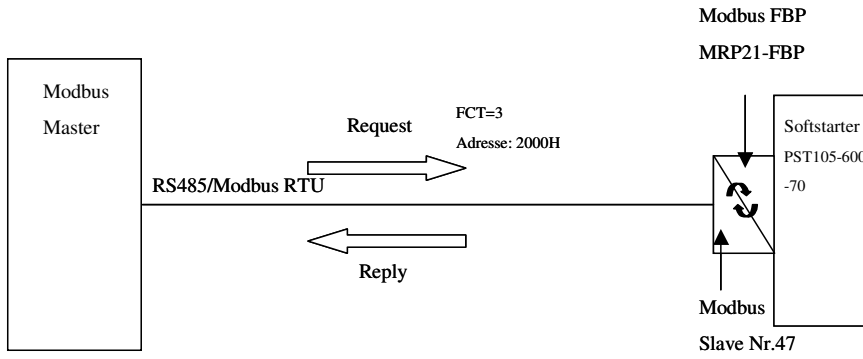
Slave 47 FCT=03 Adresse 9 Words CRC

Reply

Slave 47 FCT=03 18 Byte

| | | | | | | | | | |
|------------|------------|------------|-------------|-----------|---------------|------------|-------------------|----------|-----|
| W0 | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | CRC |
| L1 current | L2 current | L3 current | max current | Frequency | Output vplage | Mot. Temp. | Number of starts. | Run time | |

Read diagnostic inputs

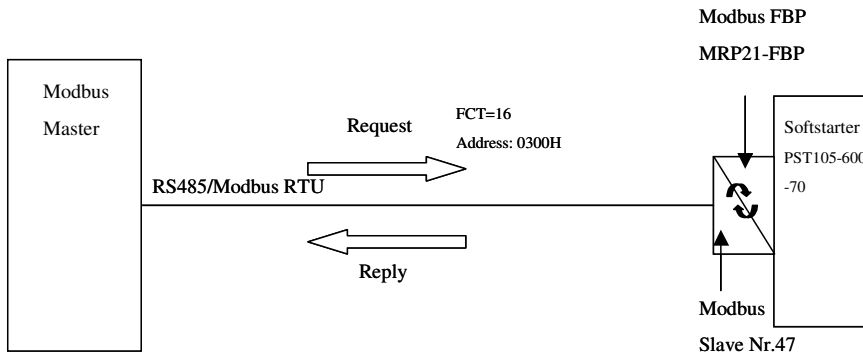


e.g.: read 3 diagnostic words starting at the address 2000H

```

Request
2F 03 20 00 00 03 08 45
  |  |  |  |  |  |  |
  |  |  |  |  |  |  |
Slave 47  FCT=03  Address 3 Words CRC
  |
Reply
2F 03 06 00 00 00 00 00 F4 D4
  |  |  |  |  |  |  |  |
Slave 47  FCT=03  6 Byte  W0  W1  W2  CRC
  
```

Write analogue output telegram



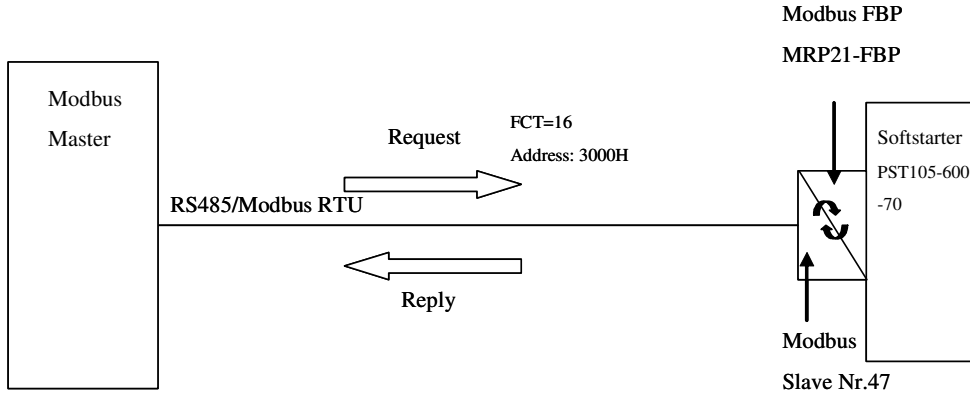
e.g.: write 6 words starting at the address 0300H

```

Request
2F 10 03 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 00 00 1B 09
  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
Slave 47  FCT=16  address 6 words 12 Bytes  W0  W1  W2  W3  W4  W5  CRC
  |
Reply
2F 10 03 00 00 06 46 01
  |  |  |  |  |  |  |
Slave 47  FCT=16  address 6 words  CRC
  
```

- W0** : year
- W1** : month
- W2** : day
- W3** : hour
- W4** : minute
- W5** : sec

Write parameter data



e.g. write **113 words** starting at the address 3000H.

Request

2F 10 30 00 00 **71 E2** 00 00 00 00 **XX XX**

Slave 47
FCT=16
Address **113** Bytes **W0** **W112** CRC

Words **226**

W0 : Current Ie, 0-3000 A

.....

W8 : Kick start level, 50- 100%

.....

W112 : Fieldbus autodisable, Yes/No

Reply

2F 10 30 00 00 **71 XX XX**

Slave 47
FCT=16
Address **113** CRC

Words

ABB CPU as Modbus RTU master

By using the ABB 07 KT 97 CPU or the new AC500 CPU s there are some special function blocs **MODBUS_RTU** available in order to make the data communication easy to project.

On the inputs of the FB you can specify the jobs has to be executed, the areas for sending and receiving data and the slave numbers of the Softstarters in the application.

The data exchange and handling will be executed by the FB.

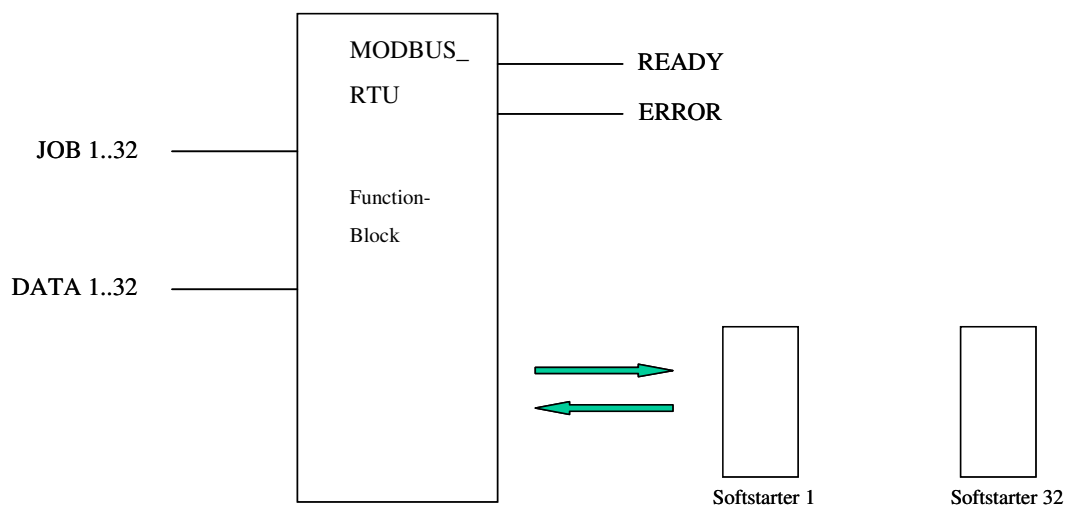


ABB Automation Technologies AB, Cewe-Control

S-721 61 Västerås, SWEDEN

Telephone +46 21 32 07 00

TELEFAX +46 21 12 60 01