

Transmitter HC300V1

Technical information

Version 1.0

- * Master for MODbus communication (RS485)
- * Datalogging with 4 Mbyte memory
- * Logging of up to 60 measuring points
- * Built-in circuit for time and date (RTC)
- * 10 years battery backup on RTC
- * Serial data transfer to PC via RS232
- * 4 analogue inputs with logging
- * Selectable (0)4-20mA or 0-10V individual pr. input
- * Galvanic isolation between input and output (incl. 24V)



The HC300 Family Features

The Transmitter HC300 Family presently consists of the modules:

HC300: Datalogger/MODbusmaster w/ dual serial com. 4 analogue inp.

HC301: pH/temp. transmitter with MODbus and 4-20mA output.

HC302: O₂ transmitter with MODbus and 4-20mA output

HC303: Conductivity transmitter with MODbus and 4-20mA output

HC304: Transmitter for 4 analogue inp. w/MODbus and 4-20mA output

Display

The HC300 family has a 3 digit display and 6 LEDs for setup and displaying measured values. The 'Mode' key is used to navigate. The LED marked 'Com.' is lit when the MODbus is active.

Programming

The module is programmed by the use of 3 keys located on the front panel. The 'Mode' key is used for selecting setup and the 'Up' og 'Down' keys are used to scroll through the programmable parameters. The parameter to be altered is selected with the 'Mode' key and the value is changed using the 'Up' og 'Down' keys. Parameter no. 01 is a softwarelock which must be set to 'Off' in order to change any parameter.

The HC300 'Dat' Module Features

The HC300 primarily acts as a datalogger with 4 analogue inputs and a MODbus master for communication with other modules.

Analogue Inputs

Each of the 4 analogue inputs may be set to either (0)4-20mA or 0-10V. This is done in Setup. Futhermore, each input can be scaled to ingeneering values such as temperature, pressure, flow, kW etc. Typically a 2-wire sensor with 4-20mA output is used.

MODbus

The HC300 aquires data from other members of the HC300 family using the MODbus standard for multidrop communication. The units are connected using the RS485 system. Using Setup the sampling rate can be set between 1 second and 10 minutes. Also using Setup the number of measuring points is selected. The module has a built in clock/calender circuit with battery backup.

Data transfer to PC

The data accumulated in the HC300 may be transferred to a PC using the the RS232 connection. The transferred data may be imported by i.e. Microsoft Excel, for further data analysis.

Technical Specifications

Mechanical

Housing:	Lexan UL94V-0 (Upper part) Noryl UL94V-0 (Lower part)
Mounting:	M36 for 35 mm DIN rail
IP Class:	Housing IP40. Connector IP20
Connector:	Max 16A. Max 2,5 mm ² Max torque 0,6 Nm
Temp.:	-15 to +50 °C
Weight:	200 g
Dimens.:	D 58 x W 36 x H 86 mm
CE mark:	EN61326A

Electrical

Power Supply:	24Vdc ±10%
Consumption:	60 mA max
Input Current Range:	(0)4-20mA, 250 Ω
Input Voltage Range:	0-10V dc, 84 kΩ
Accuracy:	Class 1%
Memory for datalogging:	4 Mbyte
No. Mearuring Points:	max. 60
Clock/calender:	RTC with battery backup
Serial port 1:	RS485, 9.6/19.2 kbaud
Serial port 2:	RS232C, 115 kbaud

Parameters

Function and Programming

The 23 programmable parameters are shown in the table to the right. The table shows **Par. no.**, name, description, programming range and default setting. For access see the paragraph about programming on page 1. If the softwarelock is active the parameter setting can be read but not altered.

Par. no. 2-5 indicate the type of input. The HC300 has a fixed register in the data acquisition and data from each of the 4 inputs is only stored if the input is programmed different from 'Off'.

Par. no. 6 indicates the sampling rate for data acquisition.

Par. no. 7 indicates the number of modules (nodes) assigned to the network. In the example below a network with 3 nodes is displayed. Each node is assigned the addresses 1 to 3, giving a total of 4 modules from which data is logged. The master is capable of logging data from a network of up to 14 nodes. When addresses are assigned to the nodes the numbers must be sequential.

Par. no. 8. Each member of the HC300 Family can transfer up to 4 data inputs to the HC300 datalogger. The number of data inputs is programmed with Par. no. 8. When parameter 8 is activated the display will flash 01 indicating the number of node. Using the arrow keys the number is altered between 01 and 14. The desired node is selected with the 'Mode' key. The display now flash 1 indicating the number of inputs per node. The number is altered between 1 and 4 and selected with the 'Mode' key. In the example below the node next to the datalogger is assigned no. 1 and 2 data input (pH and temperature) is transferred, giving the setting 01.2. The second node only transfers 1 input (oxygen), giving the setting 02.1. The last node is capable of transferring 4 input, and the setting is 03.4.

Par. no. 9-16 is used to programme the unit to display engineering values. The programming is similar that of Par. no. 8; Max. Scale is selected and the 3 digits are altered using the arrow keys, finishing with the 'Mode' key. Then the decimal point is set using the arrow keys and the programming is ended with the 'Mode' key. The same procedure applies to the Min. Scale - although the decimal point is taken from the Max. scale setting. As indicated in the table the smallest possible range displayed is 100.

Par. no. 17-21. is used to set the date and time

Par. no. 22. The MODbus standard requires a baudrate of 9.600 or 19.200. This is set using Par. no. 22. Nodes assigned to the network have to be programmed to the same baudrate.

Par. no. 23. The data can be completely erased using Par. no. 23. After setup is completed **Par. no. 00** is selected and the 'Mode' key is pressed in order to return to the normal display.

Parameters

No.	Parameter	Description	Range	Default
01	Locked	Software lock	On / Off	On
02	Input 1	Type of input	Off, 4-20mA, 0-20mA, 0-10V	Off
03	Input 2	Type of input	Off, 4-20mA, 0-20mA, 0-10V	Off
04	Input 3	Type of input	Off, 4-20mA, 0-20mA, 0-10V	Off
05	Input 4	Type of input	Off, 4-20mA, 0-20mA, 0-10V	Off
06	Sample rate	Sample rate for DAQ	1s, 10s, 30s, 1m, 10m	1m
07	Nodes	No. of Nodes connected	Off, 1...14	Off
08	Inputs/Node	No. of inputs/Node	1...4	1
09	Scale Max 1	Upper value for the scale	(Min-Set) +100...999	999
10	Scale Min 1	Lower value for the scale	-99...(Max-Set)-100	0
11	Scale Max 2	Upper value for the scale	(Min-Set) +100...999	999
12	Scale Min 2	Lower value for the scale	-99...(Max-Set)-100	0
13	Scale Max 3	Upper value for the scale	(Min-Set) +100...999	999
14	Scale Min 3	Lower value for the scale	-99...(Max-Set)-100	0
15	Scale Max 4	Upper value for the scale	(Min-Set) +100...999	999
16	Scale Min 4	Lower value for the scale	-99...(Max-Set)-100	0
17	RTC, Year	Set date (Year)	07...99	7
18	RTC, Month	Set date (Month)	1...12	
19	RTC, Date	Set date (Date)	0...31	
20	RTC, Hour	Set date (Hour)	0...23	
21	RTC, Minute	Set date (Minute)	0...59	
22	Baudrate	MODbus baudrate	9,600 / 19,200	19,200
23	Erase flash	Erase data in flash (all)	dAt / dEI	dAt

Error codes

The HC300 is equipped with a software diagnostic used to test if the network is operating as expected. If this is not the case an error message is displayed in the display. The format and types of error messages are listed below. When an error occurs the analogue output is automatically set to 20 mA and the display will flash 'Err' and the error code.

An error is displayed as E.AA, where E is the errorcode and AA is the node or the faulty input on the HC300:

Error code 0: Appears if the HC300 is set to (0)4-20mA input

0.01..0.04 : I_{in} is less than 3mA (only for 4-20mA input)

0.10..0.40 : I_{in} is greater than 22mA

Error code 1: Timeout in communication.

Error code 2: Communication error, typically network problem.

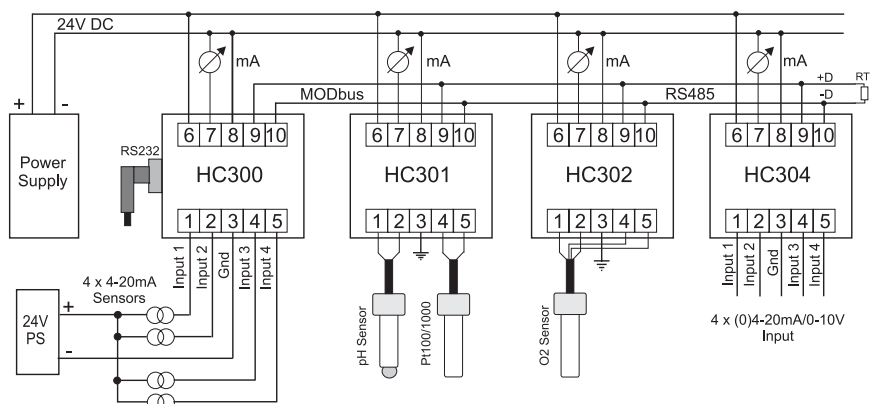
Error code 3: Wrong setup of either master or node.

Typical Installation

Notes:

The example on the right shows a network consisting of 1 master and 3 nodes. The HC300 is connected to 4 sensors and the MODbus. To maintain galvanic insulation between input and output two 24V power supplies must be applied. The HC301 measures pH and temperature and The HC302 measures oxygen. The HC304 is connected to 4 data signals. In this example data is collected from a total of 11 data signals.

If the distance between the modules is large the RS485 network is terminated with a resistor RT of typical 120Ω. The included cable is used when transferring data from the the HC300 to a PC.



Type Selection

- HC300V1: 4 input datalogging with MODbus, RS232 24V power supply. Galvanic insulation.
- HC300V2: 4 input datalogging with MODbus, RS232 12V power supply.
- HC300V3: 4 input datalogging with RS232 24V power supply. Galvanic insulation.
- HC300V4: 4 input datalogging with RS232 12V power supply.
- Software: PC software, special cable included