sylvac

SWISS MADE

S_Probe P12D

USB

IP54

Changes without prior notice
Sous réserve de toute modification
Änderungen vorbehalten

www.sylvac.ch

Quickstart guide

Edition : 2018.09 / 681.288.01

Specifications

Specifications	801.1012	801.1018	801.2012	801.2017	801.0012
Type	P12D HR USB	P12D HR USB Constant force	P12D USB	P12D USB Low force	P12D WORK USB
Resolution type	High	High	Standard	Standard	Standard
Force	0.2-0.3N	0.08N	0.4-0.8N	0.2-0.3N	0.4-0.8N
Measuring range	12.7mm				
Resolution	0.01µm		0.1µm		
Max. error	0.6µm		1µm		1.8µm
Repeatability	0.08µm		0.2µm		0.2µm
Nb measures/s	max. 100				
Connector type	USB				
Cable output	Straight				

Probe connection

The P12D is powered by the 5V line of the USB socket. It uses a device that is automatically recognized by modern operating systems. An appropriate driver is installed at the first connection.

Please refer to the manufacturer's website if your PC does not provide an appropriate driver.

After the installation has finished you should see a new "USB Serial Port" device.

Use the following connection parameters :
115'200Bd, 8 data bits, no parity, one stop bit (115'200Bd 8N1)

P12D probes are compatible with the following Sylvac software and display units :

- D300S version 2.35 and higher or 2.5 and higher for high resolution
- Sylcom version 1.3.1 and higher
- Vmux version 1.35 and higher.

Calibration

CALIBRATION CERTIFICATE

Because our instruments are produced in batches, you may find that your calibration certificate seems to be out of date. Please be assured that your instruments are certified at point of production and then held in stock in our warehouse in accordance with our Quality Management System ISO 9001. Re-calibration cycle should start from date of receipt.

Conformity

CERTIFICATE OF CONFORMITY

We certify that this instrument has been manufactured in accordance with our Quality Standard and tested with reference to masters of certified traceability by the Federal Institute of Metrology.

Main commands

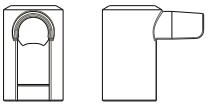
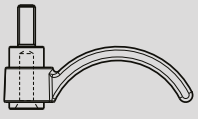
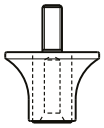
?	Get the probe's position
ID?	Get the instrument's identifier
MM/INCH	Change the measurement unit
SET	Set zero at current position
SUM?	Get the filtering parameter
SUM 1 / 16 / 256	Set the filtering parameter
UNI?	Get the measurement unit
VER?	Get the firmware version

All commands must be terminated by a carriage return character (CR, 0x0D)

Maintenance

Carefully dry all mecanical parts of the instrument after contact with liquids to ensure proper operation and avoid corrosion. Don't use aggressive products (alcohol, trichloroethylene or others) to clean plastic parts. Do not expose the instrument to direct sunlight, heat or humidity.

Accessories

Order number	Drawing	Description
801.5101[1)]		Bender 90° for P12D cable
905.2204		Stainless steel contact point M2.5
901.2005		Lifting device with photo cable
905.2224		Plastic lifting lever
905.2225		Plastic lifting ring

See general catalogue (available on www.sylvac.ch) for dimensions and more accessories.
[1)] Available in Q1/2019

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SWISS MADE

S_Probe P12D
M8

IP54

Changes without prior notice
Sous réserve de toute modification
Änderungen vorbehalten

www.sylvac.ch

Quickstart guide

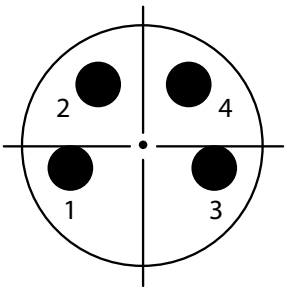
Edition : 2018.09 / 681.288.02

Specifications

Specifications	801.1212	801.1218	801.2212	801.0212
Type	P12D HR M8	P12D HR M8 Constant force	P12D M8	P12D WORK M8
Resolution type	High	High	Standard	Standard
Force	0.2-0.3N [1]	0.08N [2]	0.4-0.8N [3]	0.4-0.8N [3]
Measuring range	12.7mm			
Resolution	0.01µm		0.1µm	
Max. error	0.6µm		1µm	1.8µm
Repeatability	0.08µm		0.2µm	0.2µm
Nb measures/s	max 100			
Connector type	M8			
Cable output	Straight			

[1] ± 20%, vertical position, not usable with probe to the top
[2] ± 20%, only usable in vertical position, probe to the bottom
[3] ± 20%, vertical position

Connection



M8 male connector (front view)

	X	Y
1	-1.70	-0.50
2	-1.08	1.45
3	1.70	-0.50
4	1.08	1.45

Pin	Signal	Description
1	Power	5V
2	A	RS485 A
3	Ground	OV
4	B	RS485 B

Use the following connection parameters :

ASCII : 115'200Bd, 8 data bits, no parity, one stop bit (115'200Bd 8N1)
MBus : 187'500Bd, 8 data bits, odd parity, one stop bit (187'500Bd 8O1)

The probe starts in ASCII mode at 115'200Bd,8N1
As soon as it recognizes a bus command, it switches to 187'500Bd,8O1
It stays at this baudrate as long as the power supply is not interrupted.

Sylvac P12D M8 probes are designed to be used with Sylvac D62S display unit.

Calibration

CALIBRATION CERTIFICATE

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Conformity

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Main bus commands

OrbitGetInfo	Get device information
OrbitIdentify	Get device ID
OrbitNotify	Return factory ID if moving
OrbitSetaddr	Set temporary short address
OrbitRead2	Get current position

Main ASCII commands

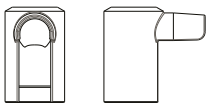
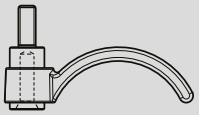
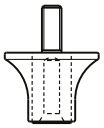
?	Get the probe's position
ID?	Get the instrument's identifier
MM/INCH	Change the measurement unit
SET	Set zero at current position
SUM?	Get the filtering parameter
SUM 1 / 16 / 256	Set the filtering parameter
UNI?	Get the measurement unit
VER?	Get the firmware version

All commands must be terminated by a carriage return character (CR, 0x0D)

Maintenance

Carefully dry all mecanical parts of the instrument after contact with liquids to ensure proper operation and avoid corrosion. Don't use aggressive products (alcohol, trichloroethylene or others) to clean plastic parts. Do not expose the instrument to direct sunlight, heat or humidity.

Accessories

Order number	Drawing	Description
801.5101[1)]		Bender 90° for P12D cable
905.2204		Stainless steel contact point M2.5
901.2005		Lifting device with photo cable
905.2224		Plastic lifting lever
905.2225		Plastic lifting ring

See general catalogue (available on www.sylvac.ch) for dimensions and more accessories.
[1)] Available in Q1/2019

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SWISS MADE

S_Probe P12D

WORK Open

IP54

Changes without prior notice
Sous réserve de toute modification
Änderungen vorbehalten

www.sylvac.ch

Quickstart guide

Edition : 2020.06 / 681-288-03

Specifications

Specifications	801.0412
Type	P12D WORK Open
Resolution type	Standard
Force	0.4-0.8N [1]
Measuring range	12.7mm
Resolution	0.1µm
Max. error	1.8µm
Repeatability	0.2µm
Nb measures/s	max 100
Connector type	Open
Cable output	Straight
Cable length	2m

[1] ± 20%, vertical position

For further information please visit
www.sylvac.ch/P12D :

Connection

P12D Open has no connector, only an open cable end. Please refer to the following table for correct connection.

Color	Signal	Description
White	A	RS485 A
Brown	Power	5V
Green	B	RS485 B
Yellow	Ground	OV
Braid	Earth	Shielding

Cable specifications

Flexible, shielded, drag chain compatible cable, UV and oil resistant, 4x0.14mm2 cross section, color-coded according to DIN 47100, 5.1mm outer diameter.

Interface

Use the following connection parameters :

ASCII : 115'200Bd, 8 data bits, no parity, one stop bit (115'200Bd 8N1)
MBus : 187'500Bd, 8 data bits, odd parity, one stop bit (187'500Bd 8O1)

The probe starts in ASCII mode at 115'200Bd,8N1
As soon as it recognizes a bus command, it switches to 187'500Bd,8O1
It stays at this baudrate as long as the power supply is not interrupted.

Maintenance

Carefully dry all mecanical parts of the instrument after contact with liquids to ensure proper operation and avoid corrosion. Don't use aggressive products (alcohol, trichloroethylene or others) to clean plastic parts. Do not expose the instrument to direct sunlight, heat or humidity.

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Conformity

CERTIFICATE OF CONFORMITY

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MBus commands

The MBus protocol is compatible with the Solartron ORBIT® protocol. For a complete list of supported commands see ORBIT® Protocol Description.

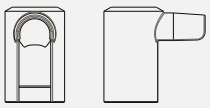
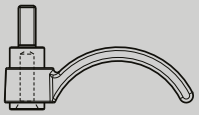
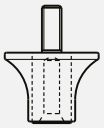
GetInfo (B)	Get device information
Identify (I)	Get device ID
Notify (N)	Return factory ID if moving
SetAddr (S)	Set temporary short address
Read2 (L)	Get current position

ASCII commands

?	Get the probe's position
ID?	Get the instrument's identifier
MM/INCH	Change the measurement unit
SET	Set zero at current position
SUM?	Get the filtering parameter
SUM 1 / 16 / 256	Set the filtering parameter
UNI?	Get the measurement unit
VER?	Get the firmware version

All commands must be terminated by a carriage return character (CR, 0x0D)

Accessories

Order number	Drawing	Description
801.5101		Bender 90° for P12D cable
905.2204		Stainless steel contact point M2.5
901.2005		Lifting device with photo cable
905.2224		Plastic lifting lever
905.2225		Plastic lifting ring

See general catalogue (available on www.sylvac.ch) for dimensions and more accessories.

P12D - Interface description

ASCII MODE

In ASCII mode each probe needs its master device, chaining multiple probes is not possible. The USB and the M8 version can both be used in ASCII mode. This mode is best suited to configure a device by using a simple RS232 terminal program like the "Terminal" integrated with Vmux LITE (1 instrument), available free of charge on **www.sylvac.ch**.

The USB version creates à virtual COM port (recent operating systems automatically install an appropriate FTDI driver) for direct communication with the probe. The M8 version needs an RS485 differential line driver. An USB-to-RS485 converter is available from Sylvac.

Connection parameters: 115'200Bd, 8 data bits, no parity, one stop bit (115'200 8N1)

Data packet description: An ASCII command is composed of one or more printable and case insensitive ASCII characters. Each command must be terminated by a carriage return character (ASCII 0x0D). The device's response follows the same format.

ASCII commands

?	Get the probe's present position
ID?	Get the instrument's identifier
MM / IN	Change the measurement unit to millimetres/inches
UNI?	Get the measurement unit
SET	Set zero at the current position (zero preserved, even if disconnected)
SN?	Get the device's serial number
SUM?	Get the filtering parameter value (number of samples for moving average filter)
SUM 1 / 16 / 256	Set the filtering parameter value
VER?	Get the firmware version

Error codes

Code	Error	Explanation	Solution
ERR1	Parity error	Parity error in RS-232 communication	Check your connection parameters
ERR2	Unknown command	The command is not supported	
ERRC	Condensation	Capacitive measurement error	Dry your device and try again
ERRD	Drops	Inconsistent capacitive measurement	Move the probe and try again
ERRE	Saturation	AD converter error	Restart the probe. If the error is still present, the probe must be reinitialised at the factory

Examples

Master (PC)	Device (probe)	Remarks
?\r	+09.52572\r	Typical response from P12DHR
VER?\r	r2.03 16.07.2018\r	Firmware version may be different

MBUS MODE

The MBus protocol allows the connection of up to 31 devices on the same data bus. Simple T-adapters can be used to extend the data bus. The master can use broadcast commands to address all the devices on the bus and get synchronised measurement values from multiple devices.

Connection parameters: 187'500Bd, 8 data bits, odd parity, one stop bit (187'500 8O1)

Data packet description :

Command frame

Break	Function code (1B)	Address (1B)	Data (0…n Bytes)

Response frame

Function code (1B)	Data (1…n Bytes)

Error frame

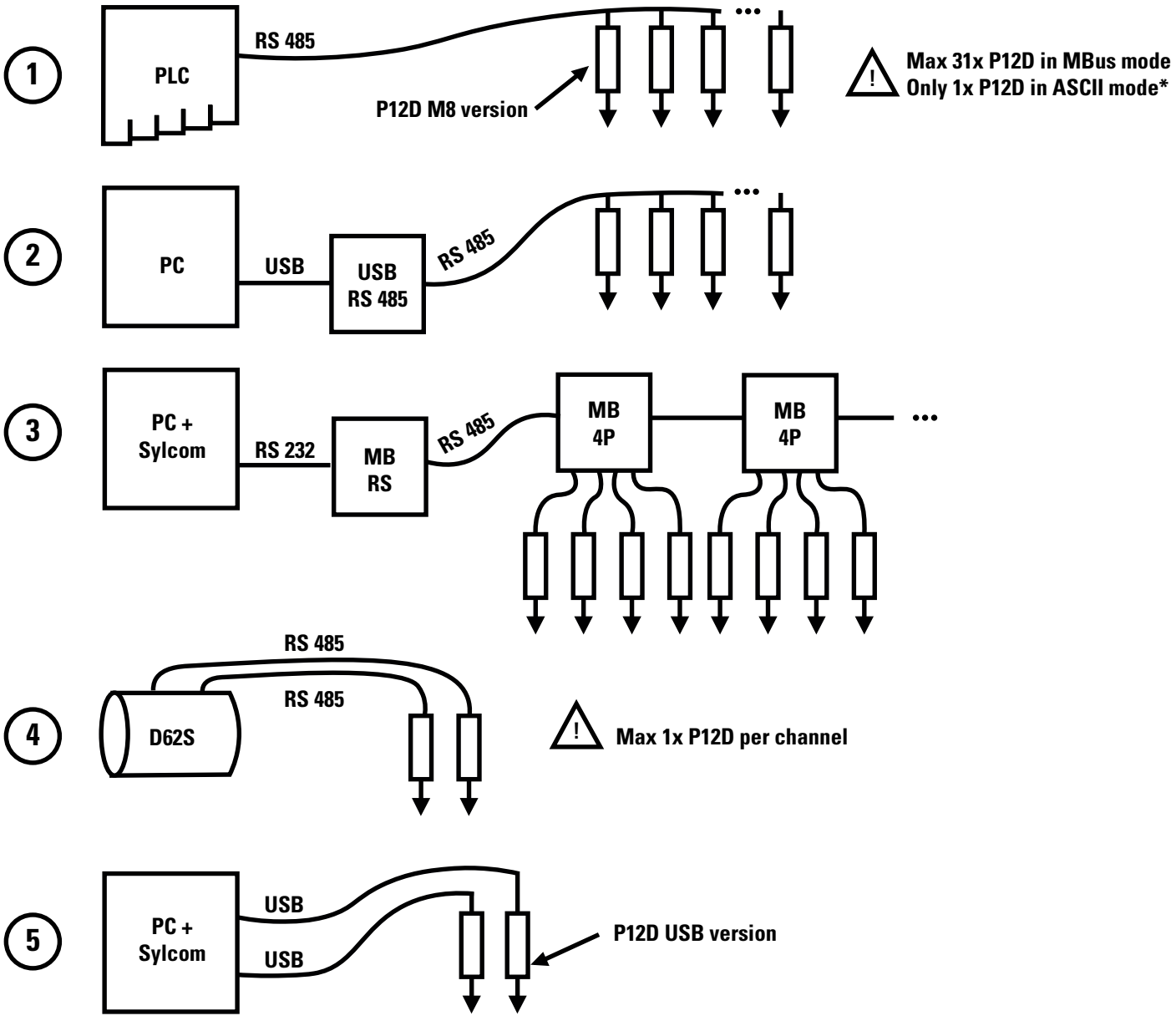
'!' (ASCII 0x21)	Exception code (1B)

New devices on the data bus can be found using the Notify command. The freshly connected probe will respond to the command if it is moved at least 1mm. The answer contains its identifier which is needed to set a temporary, short address for the new device by issuing the SetAddress command.

The MBus protocol is compatible with Solartron ORBIT® protocol. For a complete list of supported commands see ORBIT® Protocol Description.

Connection examples

The following picture illustrates some possible connections of the Sylvac digital probes

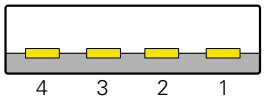


Only the USB version of the probe can be connected directly to a PC using one USB port per device (example no. 5). The M8 version is intended for industrial equipment, such as Programmable Logic Controllers (PLC) or the Sylvac D62S display unit. It needs a converter to be connected with a PC.

* Digital probes in ASCII mode are not addressable, thus only one device can be used on each bus.

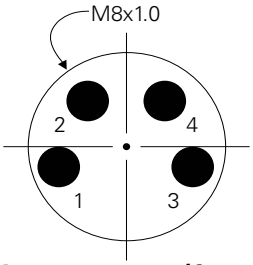
Hardware

Connectors



USB Type-A (front view)

PIN	Signal	Description
1	VCC	Positive power supply (5V)
2	D-	Negative data line
3	D+	Positive data line
4	GND	Negative power supply (0V)



M8 male connector (front view)

PIN	X [mm]	Y [mm]
1	-1.70	-0.50
2	-1.08	1.45
3	1.70	-0.50
4	1.08	1.45

PIN	Color	Signal	Description
1	Brown	VCC	Positive power supply (3.5...25V)
2	White	A	RS-485 negative data line
3	Yellow	GND	Negative power supply (0V)
4	Green	B	RS-485 positive data line
Shield	Braid	PE	Protective Earth (shielding)

Cables

USB cable length must not exceed 5m. Any USB 2.0 compatible extension can be used.
The M8 version supports up to 100m total bus length. Use only shielded 4 pin M8 extension cables.

Electrical specifications

Power supply voltage (VCC)	3.5 V – 25 V	device can be USB-bus-powered
Current consumption (ICC)	2.5 mA	VCC = 5V (add 17 mA for USB interface)
Differential output voltage (VOD)	min 1.5 V	R ≥ 27Ω (only for M8 version)

ORBIT® Protocol Description

Default RS485 configuration for ORBIT® protocol:
187'500 bauds
8 data bits
Odd parity
1 stop bit

ORBIT® Transactions

The master issues an ORBIT® command frame on the bus. The addressed slave may or may not answer, depending on the command. For further details about the ORBIT® protocol, refer to the Solartron© ORBIT® Protocol specifications.

ORBIT® Frames description

Command frame format

Break	Function code (1 byte)	Address (1 byte)	Data (0...n bytes)

Break: Break condition of RS485 line (at least 11 bits @ 0)
Function code: See the following table for supported functions
Address field: Slave address (ASCII 1...31, address zero is reserved for broadcast)
Data: 0…n bytes

Normal response frame format

Function code (1 byte)	Data (1…n bytes)

Exception response frame format

"!" (ASCII 0x21)	Exception code (1 byte)

Broadcast answer frame format

If the master issues a broadcast command, it doesn't expect an answer. The only exception is the Notify command "N" (see below).

Supported ORBIT® functions

Function code (ASCII)	Description	Command format	Answer format
B	Get Info	<break> “B” ADR	“B” 4-bytes-module-type 2-bytes-hardware-type 2-bytes-resol 32-bytes-info
C	Clear	<break> “C” ADR	“C” ADR
G	Get Status	<break> “G” ADR	“G” 1-byte-error 2-bytes-status
I	Identifiy	<break> “I” ADR	“I” 10-bytes-ID 12-bytes-dev-type 5-bytes-version 2-bytes-stroke
L	Read2	<break> “L” ADR	“L” 4-byte-probe-position
N	Notify	<break> “N” 0x00	“N” 10-bytes-ID (answer only if probe has moved more than 1mm)
P	Preset	<break> “P” ADR 4-bytes-preset	“P” ADR
R	Reset	<break> “R” 0x00	No answer (broadcast command)
S	Set Address	<break> “S” ADR 10-bytes-ID 0x00	“S” ADR
V	Set Mode	<break> “V” ADR 2-bytes-Mode 2-bytes-Argument	“V” ADR
W	Control	<break> “W” 1-byte-Action	No answer (broadcast command)

Exception code	Description
0x00	Normal
0x01	Parity error
0x03	Unknown command
0x04	Broadcast not allowed
0x05	Broadcast expected
0x06	Address change not allowed
0x09	Missing reading (bus is too slow)
0x0A	Reading not yet available (bus is too fast)
0x12	Underrange error
0x13	Overrange error
0x40	Invalid mode (of command "V")
0x60	Average value invalid
0xC4	Overspeed error

Status code	Description
0x0004	Positive direction
0x0300	Synchronization mode
0x0400	Sample mode
0x0800	New reading available

Note: Multibyte parameters start with LSB first

Device parameters

Commands	Parameters	Examples	Description
B	4-bytes-module-type 2-bytes-hardware-type 2-bytes-resol 32-bytes-info	“LE25” 0x0001 0x64 “V102P[-xx] 01.02.16” “MMR3D+D0F1”	Linear Encoder 25mm type 1 In multiples of 10nm -> 100 x 10nm = 1µm Firmware version[-options] date 2 characters for each of up to 7 options MM or IN or MO or IO (mm/inch or only) R2 or R3 or R_ (0.001µm/0.01µm/undefined) D+ or D- or D_ (Direction +/-/ undefined) D0 or D1 or D_ (Radius/Diameter/ undefined) F1 or F2 or F_ (Reference 1/2/ undefined)
G	1-byte-error 2-bytes-status		See Exceptions codes for 1-byte-error See Status codes for 2-bytes-status
I	10-bytes-ID 12-bytes-dev-type 5-bytes-version 2-bytes-stroke	“9#L1” “YYWWNN” “SYL289-LE095” “r102P” 0x19	Sylvac instrument + Year Week Number Sylvac PM289-Linear Encoder type .950 Firmware version Stoke in mm
L	“L” 4-byte-probe-position	0x002F EFD6	32 bits signed value
N	10-bytes-ID	“9#L1” “YYWWNN”	Sylvac instrument + Year Week Number (the instrument sends its ID only if the probe has moved more than 1mm)

Commands with parameters

Commands	Parameters	Description	
P	4-bytes-preset	A new 32 bits signed preset value expressed in units of resolution as defined by Get Info command.	
S	10-bytes-ID	If 10-bytes-ID matches the received ID, then the instrument stores the new address.	
V	2-bytes-mode 2-bytes-argument	Mode 0x0000: normal mode 0x000A: synchronized mode (not used) 0x0014: sampled mode 0x001E: capture (not used) 0x0032: set value	Argument averaging value : 1,16 or 256
W	1-byte-action	Action 0x00: clear buffer 0x01: start synchronization (not used) 0x02: stop synchronization (not used) 0x03: take and store a sample (read it with “L”)	