Operating Instructions M-Box / L-Box / C-Box

Interfaces at the Interface Box and their Configuration

Interface Classes

The M-Box knows five different interface classes: Digimatic, MultiRS232, OptoRS232, RS232C, SY4 and TTL-RS232. Any of these interface classes is designed to set the electrical signals of certain instruments to the correct level which can be processed by the M-Box.

The recognition and conversion of measured data to a uniform data format is then performed by the operating software of the M-Box, the M-Box only needs to know which intrument is connected. This information is provided before each measurement by transmitting the company number included in the command string.

The company number always consists of three numerical ASCII characters.

The evaluation software, i.e. the program which requests the measured data from the interface box and processes them, must be configured in such a way that it transmits the correct company numbers according to the instruments used to the interface box to ensure correct data processing.

An instrument may only be connected to an interface of the corresponding class, as otherwise the interface box or the instrument are damaged. An exception is the MultiRS232 interface class, as it combines the classes OptoRS232, RS232C and TTL-RS232 on one interface plug, however on different pins.

Important: To ensure faultfree interface function make sure that the correct instrument cable is used. See instrument table for this purpose.

Digimatic Interface

The Digimatic interface is supported by Mitutoyo, PAC and Kröplin. The following instruments can be connected:

Instrument	Function	Company No.	Data cable (Order No.)
Mitutoyo manual instrument	Measured value	001	Original cable
Marposs/Digimatic	Measured value	001/002	Original cable
Mahr (16Exd caliper and Extramess 2000)	Measured value	001	Original cable
Kröplin/PAV instrument	Measured value	001	Original cable

OptoRS232-Interface

The OptoRS232 interface is meanwhile supported by all leading European instrument manufacturers. Unfortunately, nearly every manufacturer uses a different transmission protocol so that the interface box uses different company numbers to process the instrument. The following instruments can be connected.

Instrument	Function	Company No.	Data cable (Order No.)
Helios 'Universal' clock	Normal value	300	Original cable Sylvac **Simplex** 926.5521
Helios 'Universal' clock	MIN value	301	
Helios 'Universal' clock	MAX value	302	
Helios 'Universal' clock	DEL value	303	
Helios 'Universal' clock	CLEAR	304	
Helios 'Universal' clock	PRESET +0	305	
Mahr 1082 clock	Measured value	179	
Mahr 1085 clock	Measured value	276	
Mahr 1085 clock	Zeroes	327	
Mahr 1085 clock	Max	328	BOBE cable **ESY 2.2 Simplex** (9-pole)
Mahr 1085 clock	Min	329	
Mahr 1085 clock	Diff.	330	
Mahr 1085 clock	Extrem.	331	
Mauser digital 6	Measured value	274	
Sylvac manual instrument	Measured value	179	BOBE/Mahr cable **ESY 2.4** (4-pole)
Sylvac Microcal caliper	Measured value	275 oder 179	
Tesa DigitCal OptoRS232	Measured value	209	
Tesa Digico 10 clock	Measured value	179	
Tesa Hite level instr.	Measured value	298 [1]	
Tesa digit-cal capa system	Measured value	274	
Tesa micromaster capa system	Measured value	274	
Tesa TTD20/60 OptoRS232	Measured value	323	
OptoRS232 Standard	Measured value	179	Helios, Mahr, Tesa, Preisser

[1] Tesa Hite cannot be requested to send data via the interface, but it sends data after operating the trigger key on the instrument. We recommend to select a data direction option without time-out to avoid error messages if data transmission has not been triggered within the time-out interval.

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RS232C Interface

The RS232C interface is certainly the most commonly used interface for PCs. This interface class is supported by a correspondingly great number of instruments the following instruments can be connected:

instrument	Function	Company No.	Data cable (Order
Heidenhain VRZ-counter	Measured value	017	B0016
Heidenhain ND-counter	Measured value	292	B0016
Helios Unitron-counter	Measured value	293	B0020
Kern 510	Instant. value	270	B0037
Kern 510	Quiescent value?	271	see above
Kern 510	Temperature	272	see above
Kern 510	Balancing	273	see above
Mahr Millitron 1240/150x	Measured value	299	B0014
Mahr 817 CI level instrument	Measured value	298 [2]	B0022
Mettler PM 3000	Instant. value	205	B0007
Mettler PM 3000	Quiescent value	206	see above
Mettler PM 3000	Balancing	207	see above
Precisa Series 300	Instant. value	279	B0008
Precisa Series 300	Quiescent value	280	see above
Precisa Series 300	Balancing	281	see above
Accu Force	Measured value	067	B0052
Sartorius MC 1	Measured value	067 [1]	B0006
Sartorius MC 1	Balancing	204	see above
Sony U12/U30/U60/LZ51-C	Display value	059	B0002
Sony U12/U30/U60/LZ51-C	Clear	060	see above
Sony LZ51-C	Min value	057	see above
Sony LZ51-C	Max value	058	see above
Sylvac 80/100	Measured value	275	B0050
Trimos level instrument	Measured value	298 [2]	B0022
Tesa MicroHite PowerPanel	Measured value	298 [2]	B0022
Tesa MicroHite Series 10/11	Measured value	298 [2]	B0022
Tesa MicroHite 06	Measured value	316 [2]	B0015
Tesa MicroHite 04	Measured value	067	B0034
Tesa MicroHite 1D with 1200	Measured value	314 [2]	B0026
Tesa MicroHite 1D with 4800	Measured value	315 [2]	B0026
Tesa MicroHite 1D/2D	Measured value	316 [2]	B0026
Tesa TT10	Measured value	324	B0045
Tesa TTD20	Measured value	323	B0017
Tesa TTD60	Measured value	289	B0017
Only for special versions			
Entry for special units (changed version number M-Box _____)			

Please note that equivalent units can be assigned accordingly.

[1] for the Sartorius MC1 scale, the scale setup needed to determine if the instantaneous weight value or the quiescent value (weight value after scale settling) is transmitted.

[2] Tesa MicroHite and Mahr 817 CI cannot be requested to send data via the interface, but they send data after operating the trigger key on the instrument. We recommend to select a data direction option without time-out to avoid error messages if data transmission has not been triggered within the time-out interval.

These instruments can be changed in their transmission parameters. As far as possible, the interface box is adjusted to the shop settings of the instrument. If your instrument does not harmonize with the interface box, an incorrect setting of the transmission parameters may be the reason. Please check if your instrument has been adjusted according to the Table below.

Heidenhain ND	9600 baud, even parity, 7 data bits, 2 stop bits, 0 line feeds, no handshake
Heidenhain VRZ	2400 baud, even parity, 7 data bits, 2 stop bits, 0 line feeds, no handshake
Helios Unitron	4800 baud, even parity, 7 data bits, 1 stop bit, no handshake
Kern 510	9600 baud, no parity, 8 data bits, 1 stop bit, no handshake
Mettler PM 3000	2400 baud, even parity, 7 data bits, 1 stop bit, no handshake
Precisa Serie 300	9600 baud, no parity, 8 data bits, 1 stop bit, no handshake
Sartorius MC-1	1200 baud, odd parity, 7 data bits, 1 stop bit, no handshake
Sony LZ51-C	4800 baud, no parity, 8 data bits, 1 stop bit, no handshake
Tesa MicroHite 04	1200 baud, odd parity, 7 data bits, 1 stop bits, no handshake
Tesa MicroHite PowerPanel	4800 baud, even parity, 7 data bits, 1 stop bit, no handshake
Tesa MicroHite 1D/2D/06	4800 baud, even parity, 7 data bits, 1 stop bit, no handshake
Tesa TTD 60	4800 baud, even parity, 7 data bits, 1 stop bit, no handshake
Tesa Digico 1/2 u. Compac	1200 baud, even parity, 8 data bits, 1 stop bit

SY4 Interface (M-Box 27 and M-Box 29)

The SY4 interface was very common but has now been replaced by OptoRS232. For SY4, the implementation of various company numbers was likewise necessary as different manufacturers selected different transmission protocols: The following instruments are supported:

- Sylvac Digimet caliper
- Mauser external screw type micrometers
- Blankenhorn manual instruments
- FMS manual instruments
- Helios manual instruments
- Mahr manual instruments
- Preisser manual instruments
- Import-caliper from China

The various protocols differ in plus/minus signs and multiplicators.

Instrument	Function	Company No.	Data cable (Order No.)
?	Factor -1	021	ESY4.1
?	Factor -1/100	022	see above
?	Factor 1/10	023	s.o
?	Factor 1/100	024	s.o
Sylvac Digimet caliper	Factor 1	026	see above
?	Factor -1/10	027	see above

Should you use an instrument with a SY4 interface where the measured values exhibit qualifying sign errors or decimal point displacement, select a different company number.

TTL-RS232 Interface

Instrument	Function	Company No.	Data cable (Order No.)
Tesa Digit	Measured value	028	B0004
Tesa DigitCal	Measured value	028	B0005
Tesa Digico 1 & 2 /Compac	Measured value	028 [1]	B0010 without request B0074 with request B0079 with request

[1] the Tesa Digico 1 & 2 cannot be requested to send data via the interface for all boxes, but they send data after confirming the PRINT key on the instrument. We recommend to select a data direction option without time-out to avoid error messages if the measured value transmission has been triggered within the time out interval. For boxes which may request the unit via the interface to send the cables B0074 or B0079 (with power supply unit plug) are needed.

MultiRS232 Interface

The MultiRS232 interface is a combination of the interface classes **OptoRS232**, **RS232C and TTL-RS232**. All instruments grouped under these classes can be connected to interface boxes with MultiRS232 interface.