

Ethernet system for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature inputs

MSX-E3711

Simultaneous acquisition of
up to 8 inductive displacement transducers

For half-bridge, LVDT, Mahr or Knaebel transducers

1 incremental counter input (32-bit)

1 input for temperature measurement (Pt100)
or for thermocouples (TC)

24 V digital trigger input



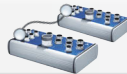
Integrated
Ethernet switch



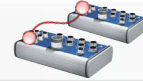
*Operating temperature



ARM®9
Technology



Cascadable, can be
synchronised
in the μ s range



On request:
Compare logic for
synchro trigger signal



on request



DatabaseConnect
see page 114



More information at
www.addi-data.com

Features

- ARM®9 32-bit processor
- Robust standardized metal housing
- Power Save Mode: Reduced power consumption when no acquisition runs

Transducer inputs

- 8 transducer inputs, 24-bit, 5-pin M18 female connector
- Half-bridge (HB), LVDT, Mahr-compatible, Knaebel
- Simultaneous acquisition
- Diagnostic option (short-circuit, line break)

Counter input

- 1 x 32-bit incremental counter input, max. 5 MHz
- Voltage supply of sensors with M23 female connector (24 V or 5 V)
- Single, double, quadruple edge analysis
- Compare logic

Temperature input

- 1 x RTD input, 16-bit, 5-pin M12 female connector
- +/- 0,01 °C resolution
- Thermocouple input, optional (MSX-E3711-TC)

Safety features

- Status LEDs for fast error diagnostics
- Optical isolation
- Input filters
- Overvoltage protection ± 40 V
- Internal temperature monitoring

Interfaces

- Fast 24 V trigger input
- Ethernet switch with 2 ports
- Synchronisation/trigger In/Out
- Line in for 24 V supply and cascading

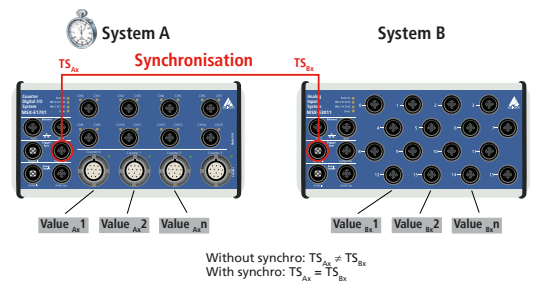
Communication interfaces

- Web server (configuration and monitoring)
- Command server SOAP for transferring commands
- Data server (TCP/IP or UDP socket) for sending acquisition data
- Event server (TCP/IP socket) for sending system events (Diagnostics such as temperature, short-circuits ...)
- Command server Modbus TCP and Modbus (UDP) for sending commands

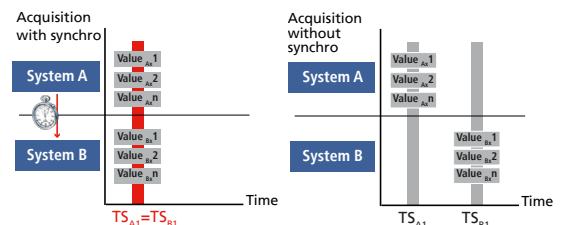
Synchronisation/time stamp

Time stamp

Several MSX-E systems can be synchronised with one another in the μ s range through a synchro connection. This allows to start a synchronous data acquisition, to generate trigger events and to synchronise the time on several MSX-E systems. Furthermore, the systems have a time stamp that logs the point in time at which the data was acquired by the system.



The combination of synchronisation and time stamp (TS) allows the clear allocation of signals that were captured by several systems.

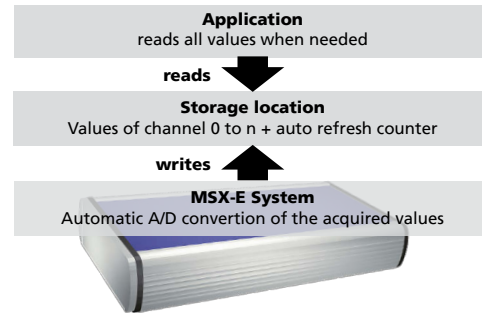




Acquisition modes

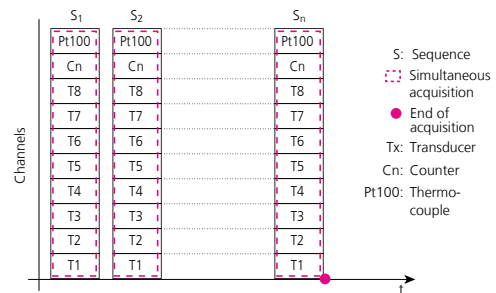
Auto-refresh mode

In the auto-refresh mode, the measurement values are updated automatically after each acquisition. The acquisition is initialised once and the values of the channels are stored in the memory of the MSX-E Ethernet system. The client (e.g. PC, server, PLC, ...) reads the acquired values asynchronously to the acquisition through socket connection, SOAP or Modbus function. Thereby, the new value is read and the old values are overwritten. In addition to the measurement values, the auto-refresh counter can also be read, which allows to sort the measurement values chronologically. The auto-refresh mode can be combined with a hardware or a synchro trigger and also allows the automatic averaging of values.



Sequence mode

In the sequence mode, a list of channels is acquired. Thereby, the single measurement rows are stored one after another. The client receives the acquired values asynchronously to the acquisition through a socket connection. In the sequence mode, the measurement values are read in chronological order, this means the oldest values are read first. The acquisition can be effected continuously, with or without delay or in combination with a hardware or synchro trigger.



Compare logic

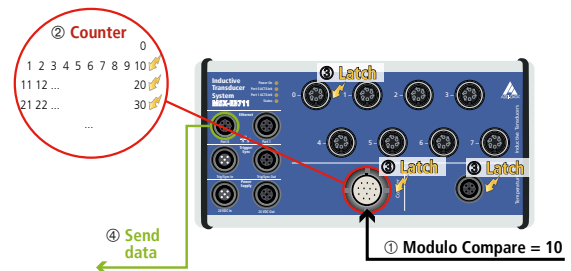
With the compare logic of the incremental counter, a synchro-trigger signal can be generated in order to latch the counter value, the transducers and the temperature input as soon as the counter value is equal to the compare value.

Thus all the inputs of the MSX-E3711 system can be acquired simultaneously.

With the additional „Modulo-Mode“ (Modulo Compare), a trigger can also be generated at the n value of the compare value.

Thus it is possible, e. g. when using an encoder with 3,600 steps / revolution to obtain each degree of a measurement value (Modulo Compare = 10).

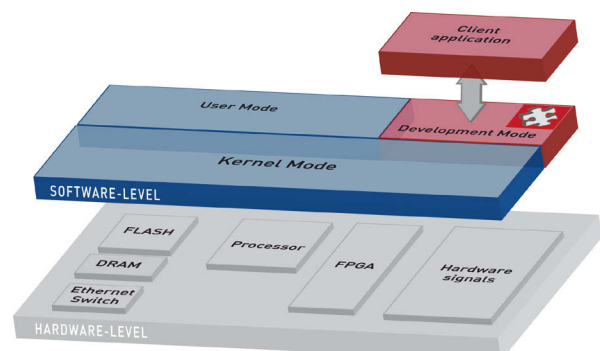
The thus generated synchro-trigger can also be used for data acquisition on further MSX-E systems.



Onboard programming / stand-alone operation

Development mode

With the Development mode of the MSX-E systems you can customise your measurement, control and regulation applications to fit your requirements. The programs run directly on the MSX-E systems, which has two advantages: external PCs are relieved and you can process data freely according to your requirements. This helps you to improve the efficiency of your processes and to secure your investments.



ConfigTools

The **ConfigTools** program allows an easy administration of the MSX-E systems. These are recognised automatically in the network. **ConfigTools** consists of common and specific functions.

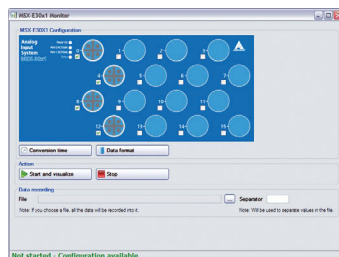
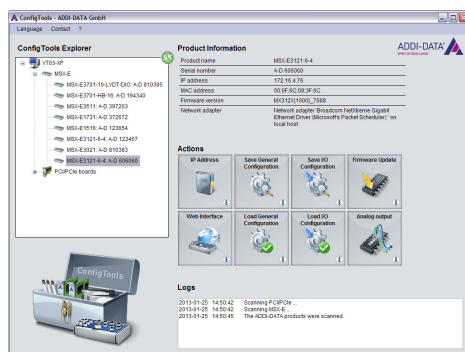
In addition, with **ConfigTools**, the complete configuration of a MSX-E system can be saved and transferred to another system of the same type (clone function).

ConfigTools is included in the delivery.

ConfigTools functions for MSX-E3711:

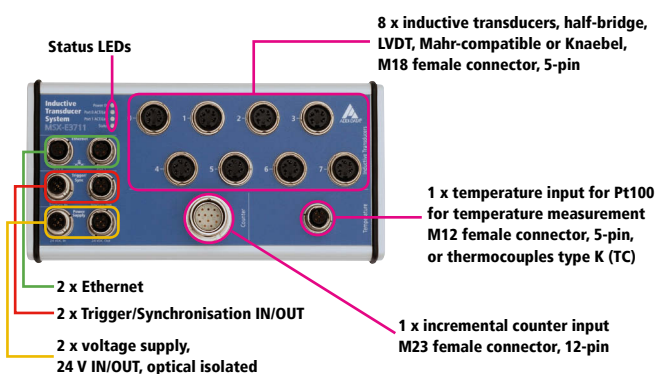
- Change of IP address
- Display of web interface
- Firmware update
- Save/load system configuration
- Save/load channel configuration
- Calibration of transducers
- Data base of transducers
- Monitoring of transducers
- Diagnostics of transducers

Very easy use through the „ConfigTools“ program; The MSX-E system is automatically detected in the network.

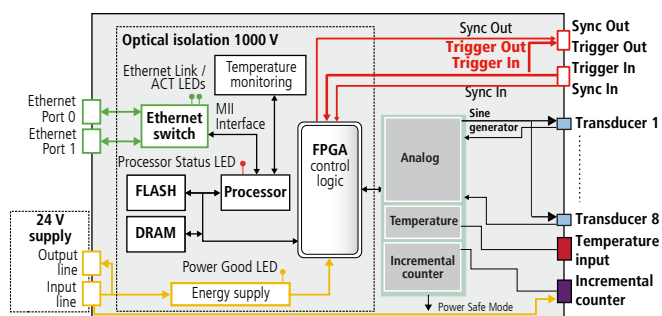


Monitor function example:
Check of the analog inputs.

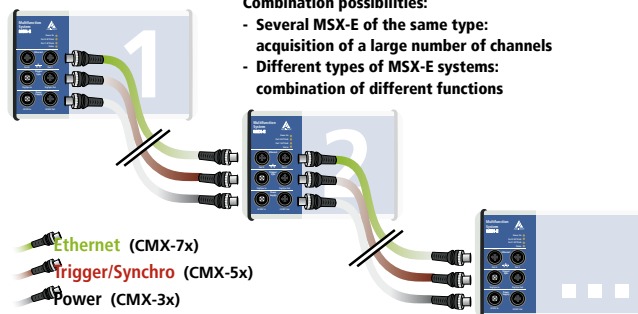
Features



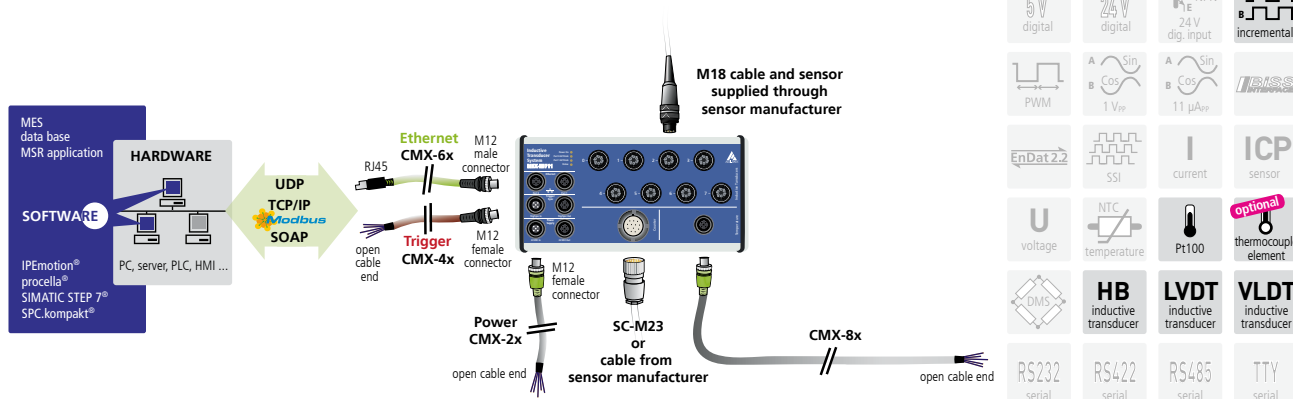
Simplified block diagram



Cascading



ADDI-DATA connection technology





Specifications

Connection of inductive transducers

Inputs for inductive transducers

Channel features:		
Number:	8 x ADC (not multiplexed)	
Input type:	Single-ended	
Coupling:	DC	
Resolution:	24-bit	
Sampling rate f_s :	On 8 channels	At primary frequency f_p of
		5 kHz
		7.69 kHz
	$f_s = f_p$	10 kHz
		12.5 kHz
		20 kHz
		50 kHz

Example with TESA GT21: $f_s = f_p = 12.5$ kHz on all 8 channels

Input level

Input impedance:	2 k Ω	software-programmable
	10 k Ω	
	100 k Ω	
	10 M Ω	

Transducer accuracy: ± 61 nm (Tesa GT21)

Sensor supply (Sine generator)

Type:	Sine differential (180° phase-shift)	
Coupling:	AC	
Programmed signals:		
Output frequency f_p (primary frequency):	2-20 kHz depending on the transducer (50 kHz Knaebel)	
Output impedance:	< 0.1 Ω typ.	
	> 30 k Ω typ. in shutdown mode	
Short-circuit current:	0.7 A typ. at 25 °C with thermal protection	

Counter

Number of counter inputs:	1
Input type:	Differential inputs or TTL
Differential inputs:	Comply with the EIA standards RS422A
Common mode range:	+12 V / - 7 V
Input sensitivity:	± 200 mV
Input hysteresis:	50 mV typ.
Input impedance:	12 k Ω min.
Max. input frequency:	5 MHz at nominal voltage
"Open Circuit Fail Safe	
Receiver Design"	"1" = inputs open
ESD protection:	Up to ± 15 kV
Voltage supply of the encoder:	5 or 24 V/500 mA max.

24 V version

This version is designed for the connection of 24 V encoders.

Only 24 V signals can be connected to the inputs.

Nominal voltage:	24 V _{DC}
Max. input frequency:	1 MHz at nominal voltage
Input impedance:	1 M Ω typ.
Logic input levels:	
UH (max.)	30 V typ.
UH (min)	18 V typical (on request)
UL (max.)	16 V typical (on request)
UL (min)	0 V typical

Temperature measurement

Number of inputs:	1
Type:	RTD Pt100 or TC type K (optional)
Connection:	4-wire
Temperature range:	-200 to 850 °C
Resolution:	± 0.01 °C

System features

Interface:	Ethernet acc. to specification IEEE802.3
Dimensions (mm):	215 x 110 x 54
Weight:	760 g
Degree of protection:	IP 65
Operating temperature:	- 40 to + 85°C
Current consumption at 24 V:	400 mA

Voltage Supply

24 VDC IN	1 x 5-pin M12 male connector
24 VDC OUT	1 x 5-pin M12 female connector

Connectors for sensors

For inductive transducers:	8 x 5-pin M18 female connector
For temperature sensors:	1 x 5-pin M12 female connector
	1-, 2-, 4-wire Pt100
For the counter function:	1 x 12-pin M23 female connector

Ordering information

MSX-E3711

Ethernet system for length measurement, 24-bit, simultaneous, 8 transducers, counter and temperature input.

Incl. technical description, software drivers and ConfigTools.

Versions

MSX-E3711-HB:	for 8 HB inductive transducers, 5 V counter input
MSX-E3711-LVDT:	for 8 LVDT inductive transducers, 5 V counter input
MSX-E3711-M:	for 8 Mahr-comp. transducers, 5 V counter input
MSX-E3711-K:	for 8 Knaebel transducers, 5 V counter input
MSX-E3711-HB-24V:	for 8 HB inductive transducers, 24 V counter input
MSX-E3711-LVDT-24V:	for 8 LVDT inductive transducers, 24 V counter input
MSX-E3711-TC:	Type K thermocouple in place of the Pt100 input, other types on request

Connection cables

Voltage supply

CMX-2x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-3x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Trigger/Synchro

CMX-4x: Shielded cable, M12 5-pin female connector/open end, IP 65

CMX-5x: For cascading, shielded cable, M12 5-pin female connector/male connector IP 65

Ethernet

CMX-6x: CAT5E cable, M12 D-coded male connector/RJ45 connector

CMX-7x: For cascading: CAT5E cable, 2 x M12 D-coded male connector

Options

S7 Modbus TCP Client Library for S7: Easy use of the Ethernet systems MSX-E with PLCs

MSX-E 5V-Trigger: Level change of the trigger inputs and outputs to 5 V

MX-Clip, MX-Rail (Please specify when ordering!), **MX-Screw, PCMX-1x**