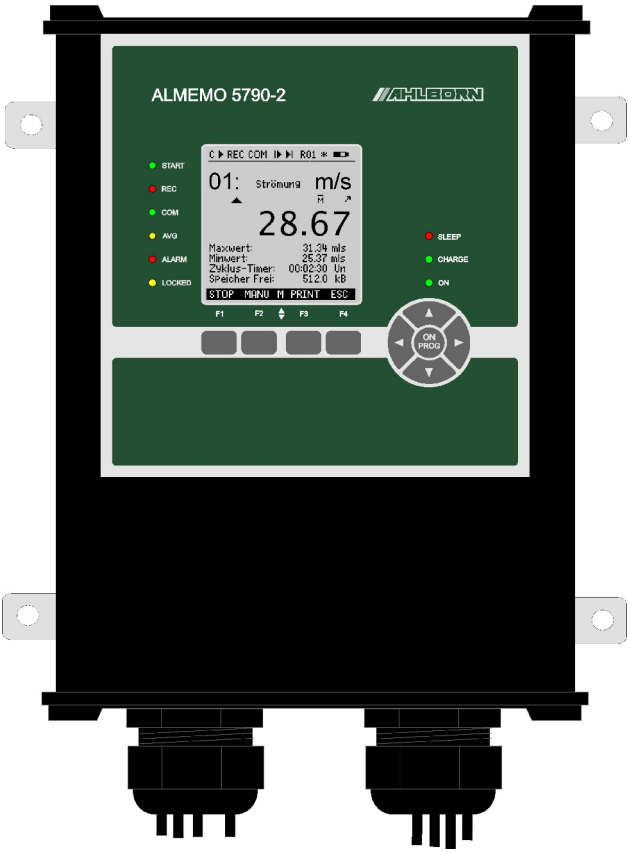
Operating instructions



V6

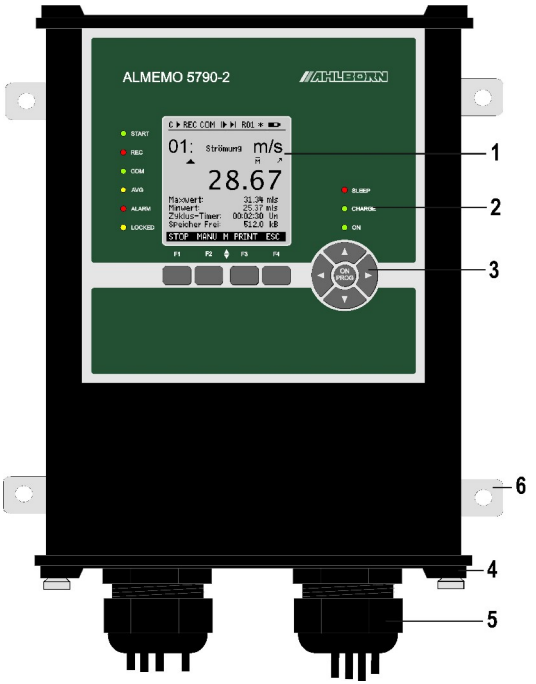
Data acquisition systems in industrial housing

ALMEMO® 5790-2M09IG2, 5790-2CPUIG2

V1.1
05.02.2010

1. OPERATING CONTROLS

1.1 Front view



(1) LCD-Anzeige

Status bar:

C	Continuous Measuring point scan
▶, ‖	Start / stop measuring
REC	Record to memory
COM	Measured value output
⏵, ⏭	Program the start / end of measuring
R01	Alarm relay state
✱, ✱	Lighting on, pause
	Battery operation / charge status

13 Zeilen für Funktionen

Funktion der Tasten F1, F2, F3, F4

(2) Status LEDs

START	Measuring operation started
REC	Measuring with results saved
COM	Measuring with output
AVG	Averaging
ALARM	Limit value overshot Sensor breakage, LoBat

(2) Status LEDs

LOCKED	Keys locked
ON	Device is switched ON
SLEEP	Flashes in sleep mode
CHARGE	Rechargeable battery is being charged. Goes out as soon as fully charged

(3) Keypad

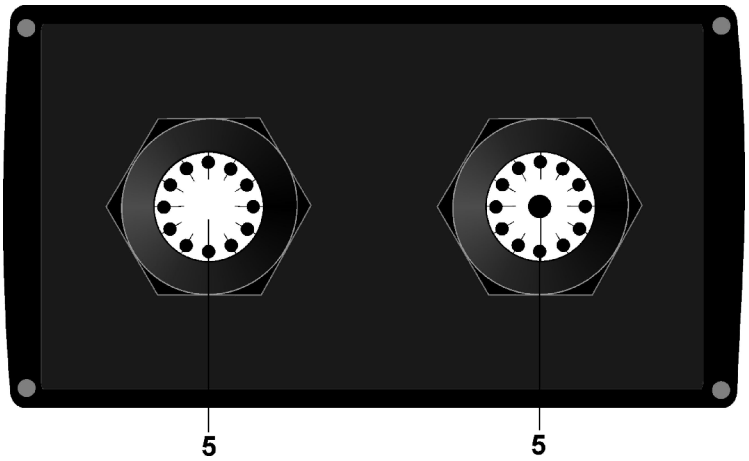
F1 ... F4	Function keys (soft-keys)
ON PROG	**Cursor block** Switch on, Programming, Switch OFF (press and hold down)
▲, ▼, ▶	Function selection, input
◀	Most recent menu

(4) Slide-in module cover

(5) Cable bushings

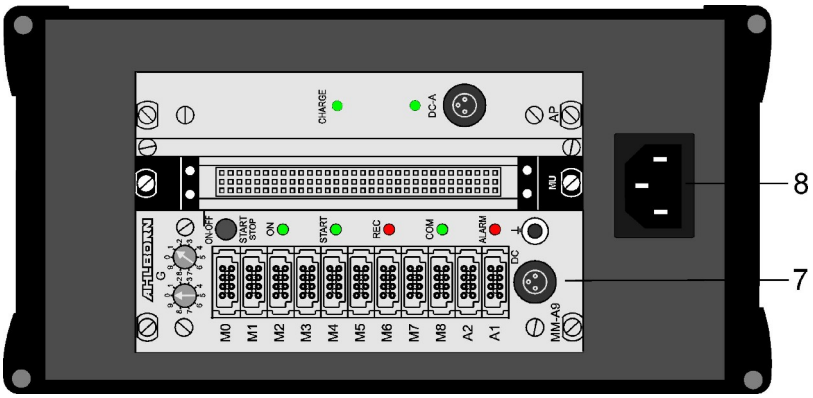
(6) Wall bracket

1.2 Bottom view - with slide-in module cover fitted



(5) Screwed cable glands with seal inserts for 25 cables

1.3 Bottom view - with slide-in module cover removed



(7) Slide-in module frame with 4 slots of 4 DU
For master measuring circuit board MM-A9
or CPU measuring circuit board, CPU
Passive selector switch boards U-A10, U-MU, U-TH, U-KS
Active measuring circuit boards M-A10, M-MU, M-TH, M-KS
Relay trigger analog module RTA5
Rechargeable battery pack

(8) Mains supply socket 90 to 250 VAC, 50/60 Hz

2. TABLE OF CONTENTS

3. GENERAL

Congratulations on your purchase of this ALMEMO® data acquisition system in its sturdy and robust industrial housing. This device incorporates standard modules from the ALMEMO® 5690-2M09 or 5690-2CPU systems; the enclosed operating instructions for those systems describe how the device should be used. The operating instructions you are now reading refer therefore only to sensor connections specific to the housing and to any technical data that deviates from the above. You are advised therefore to properly familiarize yourself with how sensors are fitted and how they function and with the device's numerous possibilities and to carefully read these operating instructions and the appropriate sections in the ALMEMO® Manual. This is the best way to avoid operating and measuring errors and prevent damage to the device or sensors. To help you find answers to your questions as quickly and easily as possible a comprehensive index is provided at the end of these instructions and at the end of the Manual.

3.1 Standard delivery

When you unpack the device check carefully for any signs of transport damage and ensure that delivery is complete.

Data acquisition system ALMEMO® 57902-M09IG2 or 5790-CPUIG2

In industrial housing with mains adapter ZB 1212-NA6, 12 V, 3 A

24 plugs, 4 mm, for the screwed cable glands

These operating instructions for the industrial housing

Operating instructions for the standard data acquisition system

ALMEMO® Manual

CD with AMR-Control software and various useful accessories

In the event of transport damage please retain the packaging material and inform your supplier immediately.

3.2 Waste disposal

This symbol means that the product is subject to European Union regulations on segregated waste disposal. This applies both to the product itself and to any accessories marked with the same symbol. Disposal of any such item as unsorted domestic waste is strictly forbidden.
Batteries and rechargeable batteries are special waste and must not be discarded as normal domestic waste.
Please dispose of packaging materials, plastics, and electronic components separately and in the proper manner.

4. SAFETY INSTRUCTIONS

CAUTION This sign is intended to warn the user of a risk of damage to the device.
The user should carefully read the operating instructions in order to avoid errors, damage to equipment, and even the risk of personal injury.

WARNING! This sign is intended to warn the user of a possibly life-threatening situation with risk of fatal injury through exposure to high voltage. The device may only be opened by duly authorized and qualified service technicians; (this restriction does not apply to the bottom cover). Before connecting any equipment to the power supply always ensure that the operating voltage is correct and that the connecting cable you use is not in any way damaged. Before attempting to install a sensor or other peripheral equipment always first disconnect the device from the power supply. Please note that the device may be susceptible to damage by electrostatic discharge or lightning.
Do not run sensor lines in the vicinity of high-voltage power cables. Before you touch any sensor lines, ensure that all static electricity has been discharged. Be sure to observe the maximum load capacity of the sensor power supply.

5. BASIC STRUCTURE OF THE ALMEMO 5790-2

Data acquisition system ALMEMO® 5790-2 comprises a robust aluminum housing, protective class IP65, and a 19-inch frame with 16 DU for standard modules from the ALMEMO® 5690 system. The basic module is either master measuring circuit board MM-A9 with 9 ALMEMO® measuring inputs or the CPU module with a measuring circuit without measuring input. To expand the measuring inputs or control outputs 1 or 2 further slide-in modules can be retrofitted. To use the device independently of the mains supply a rechargeable battery pack can be fitted.
A 12-V mains adapter (for 90 to 250 VAC) is integrated as standard.
This device, unlike the standard system, does not as standard incorporate a plug-in slot for a memory card; however, a memory connector is available as an accessory; this can be connected at output socket A2 or A3 (CPU) and will offer the same possibilities. The CPU system incorporates a 2-MB battery-buffered RAM; the master measuring circuit board can as an option incorporate a 512-KB EEPROM.
On the rear of the device four M4 threaded holes are provided, e.g. for the purposes of installation in a switchgear cabinet. These can also be used if so required to attach two wall bracket units, available as accessories; the device can then be mounted on a wall from the front.

6. PUTTING INTO SERVICE

Sensor connection: Unscrew the bottom slide-in module cover (4), open the cable glands (5), pull out the sensor line with plug, connect to the appropriate measuring input sockets on the slide-in modules, and place in the holes on the seal inserts. see 8. Screw the slide-in module cover back in position, place the seal inserts in position, and close the cable glands.

Power supply: When connecting a sensor also connect mains cable to mains socket (8) and insert in cable glands. see 7.1

Meas. value output : The measured data can be transferred to the internal measured value memory or to a memory connector with memory card or online via a data cable to a computer. When connecting a sensor the possibility of fitting a memory connector and data cable should also be considered.

Switch on: Press ON PROG key (3) on the front panel.

7. POWER SUPPLY

Power can be supplied to the measuring instrument in any of the following ways :

Integrated mains unit, 90 to 250 VAC, 12 V / 3 A see 7.1	
Electrically isolated power supply cable, 10 to 30 VDC, 0.25 A	ZB 3090-UK
Electrically isolated power supply cable, 10 to 30 VDC, 1.25 A	ZB 3090-UK2
Rechargeable battery pack, NiMH 9.6 V / 1600 mAh	ES 5690-AP

For accessories and connections see the standard operating instructions .

7.1 Mains operation

The device is powered by a mains unit, 90 to 250 VAC, 12 V / 3 A; this is integrated as standard. When connecting a sensor (see XREF) the power cable is led through the cable bushing on the right (5), plugged into the mains socket (8), and placed in the seal insert in the central hole.

8. CONNECTING SENSORS / TRANSDUCERS

The measuring inputs are located in the slide-in measuring units (7) inside the protective housing. To connect a sensor the bottom cover (4) must first be removed by unscrewing the knurled nuts. The cable glands (5) must then be opened and the seal inserts withdrawn. All sensor lines with their plugs can now be pulled out through the cable glands (nut and bolt). The sensor connectors must now be plugged onto the appropriate slide-in measuring modules; (see standard operating instructions). At the same time the power supply cable and, if so required, a data cable should also be led through the cable bus-

hing on the right. As soon as all cables have been properly connected the cover can be screwed back into position. All cables (wherever possible, diameter 3.5 to 4.0 mm) should now be led from outside into the slotted holes in the seal inserts - starting with the thicker power cable (6.5 mm) led into the middle of the insert on the right. For any holes left unused small 4-mm plugs are provided; these can simply be pushed into place wherever necessary. Finally place the seal inserts back in position in the bolts, screw on the nuts, and tighten until all slots are closed.

9. MEASURED DATA ACQUISITION

Measured data acquisition can be performed in basically two ways.

1. Perform measurement online and transfer data to the PC immediately (no device-internal memory required).
2. Perform measurement offline, i.e. the data is first saved to the device's internal memory (see 9.1) or to an external memory connector with multimedia card and then transferred to the PC later. (see 9.2)

The basic principles of ALMEMO® devices are described in the Manual;
for measured value scanning please refer to Sections 6.5 and 6.6;
for data saving please refer to Section 6.9.

For conveniently measuring data online via a PC an ideally suitable tool is our Win-Control measured value acquisition software. This software is unique in that it can, in a single measuring cycle, scan one stand-alone or several internetworked measuring devices, then save the measured data on the PC, and output it in a clearly understandable form as line diagram, table, or list.

For the purposes of measuring and recording offline the CPU version 5790-2CPU incorporates as standard a 2-MB battery-buffered RAM;
on the 5790-2M09 version the master measuring circuit board can as option S incorporate a 500-KB EEPROM. For the purposes of working offline, it is also possible in both of the above cases to attach a memory connector with multimedia card (ZA 1904-MMC) externally at an output socket.

When installing a sensor it is also important to remember the data cable or memory connector.

9.1 Measured value memory, internal

The optional memory on the 5790-2M09 version is a 512-KB EEPROM; this is sufficient for saving 64000 to 100000 measured values (depending on the number of channels); the standard battery-buffered memory on the 5790-2CPU version is sufficient for saving 250000 to 400000 measured values. The saving function can be reconfigured from linear memory to ring memory.

As on all other ALMEMO® data loggers the internal memory supports the following functions :

Recording to ring memory
Sleep mode
Data output in any normal format (CPU system in table format only)

Selective data output according to date and time-of-day
Selective data output with number code
However, only one connector configuration is possible

9.2 Memory connector with memory card

Another convenient method for data recording is to use the newly developed memory connector (ZA 1904-SD) with a conventional micro SD flash memory card. Data is written to this memory (128 to 512 MB) via the memory connector; the measured data is in table mode, standard FAT16 format. The SD card can be formatted, read out, and cleared - using the SD card adapter on any standard PC equipped with card reader. (see Manual 6.9.4.2)
Measured data can be imported into MS-Excel or into Win-Control. The memory connector works in a completely different way to the device-internal memory; this brings both restrictions and advantages.

Functions of the MMC memory connector

- Virtually unlimited memory capacity
- With each new connector configuration a new file is created.
- No recording to ring memory
- Sleep mode
- Data can be evaluated using any reader on site or anywhere else.
- Very high-speed data transfer via the reader
- Data recording and output in table format only
- On the ALMEMO device itself only the last file can be read.
- Selective data output according to date and time-of-day or by number code is not possible.

On the 5790-2M09 version the memory connector with the memory card is connected at socket A2; on the CPU version it is connected at socket A3; it is recognized automatically. If the external memory is connected at the start of any measuring operation, it will be used. In the course of the measuring operation it must not be unplugged; this would cause temporarily buffered measured values to be lost.
Before starting any measuring operation you can enter an 8-character file name. (see 11).
In the absence of a user-defined file name, the default name ´ALMEMO.001´ or the name most recently used will be suggested automatically. So long as the connector configuration is not altered, any number of measuring operations can be saved - either manually or cyclically, also with number codes, all in the same file. If, however, the **connector configuration has been changed** since the last measuring operation, a new file will be created; and, if no new file name has been programmed, the index in the file name extension will automatically be incremented by 1, e.g. ´ALMEMO.002´. Similarly, if the file name now entered already exists, a new file will be created with the same file name prefix but with a new index.
To check that the memory connector is functioning properly there is an LED incorporated in the end of the handle; this indicates the following states :

- No memory card is detected. LED flashes once long and then three times short.

- Data is being recorded. LED flashes in the same rhythm as the cycle.
- Data is being read out. LED lights up continuously for the duration of data output

Please note : If you clear the memory the card will **be reformatted.**

10. DECLARATION OF CONFORMITY

DData acquisition system ALMEMO 5790-2 complies in full with the safety requirements specified in the EU directive relating to electromagnetic compatibility (EMC) (89/336/EEC).
Ahlborn Mess- und Regelungstechnik GmbH declares herewith that data acquisition system ALMEMO® -2 carries the CE label and complies in full with the requirements of EU directives relating to low voltage and to electromagnetic compatibility (EMC) (89/336/EWG).
The following standards have been applied in evaluating the product:

Safety / security: EN 61010-1:2001
EMC: EN 61326: 2006

CE

If a product is modified in any manner not agreed with us in advance, this declaration becomes void.

11. APPENDIX

11.1 Technical data

(see operating instructions and Manual 2.3)

Housing :

19-inch aluminum housing, 16 DU	(WxHxD) 233 x 121 x 300 mm
2 cable glands, M40	Inside diameter 33.5 mm, (53 mm AF)
Multiple seal	12 holes, 4 mm, slotted
Multiple seal	12 holes, 4 mm, and 1 hole, 6.5 mm

Protection class: IP65 (using intended cable diameter)

Product overview

Order no.

Data acquisition system ALMEMO® 5790-2M09
9 inputs, maximum 40 channels, 2 outputs, cascadable interface,
9 keys, LCD graphics display, real-time clock , Power unit 12 V / 3 A
19-inch industrial housing, 16 DU, 2 free slots, 4 DU — MA 57902M09IG2

Option:
S: Integrated 512-KB EEPROM — OA 5690-S

Data acquisition system ALMEMO® 5790-2CPU
Measuring circuit for 20 measuring points with passive selector switch boards
6 output sockets, cascadable interface
9 keys, LCD graphics display, real-time clock, 2-MB RAM, Mains adapter 12 V / 3 A
19-inch industrial housing, 16 DU, 2 free slots, 4 DU — MA 57902CPUIG2

Options (* only 1 option possible)

SF	2-MB FeRAM, non-volatile, instead of RAM, buffered	OA 5690-SF
XM	Supports active selector switches with measuring circuit	OA 5690-XM
SH2	2 semiconductor relays, normally open, 1 Ω, 0.5 A, 50 V, internal	OA 5690-SH2*
TR2	2 optocoupler trigger inputs, internaL	OA 5690-TR2*
R22	2 analog outputs, 10 V, internal	OA 5690-R22 *
R32	2 analog outputs, 20 mA, internal	OA 5690-R32*

Accessories :

Memory connector, including micro SD card, minimum 128 MB, USB card reader	ZA 1904-SD
Micro SD card, minimum 128 MB	ZB 1904-SD
Wall bracket, comprising 2 aluminum supports	ZB 5790WH

11.2 Index