Dala Rafn
VE 508

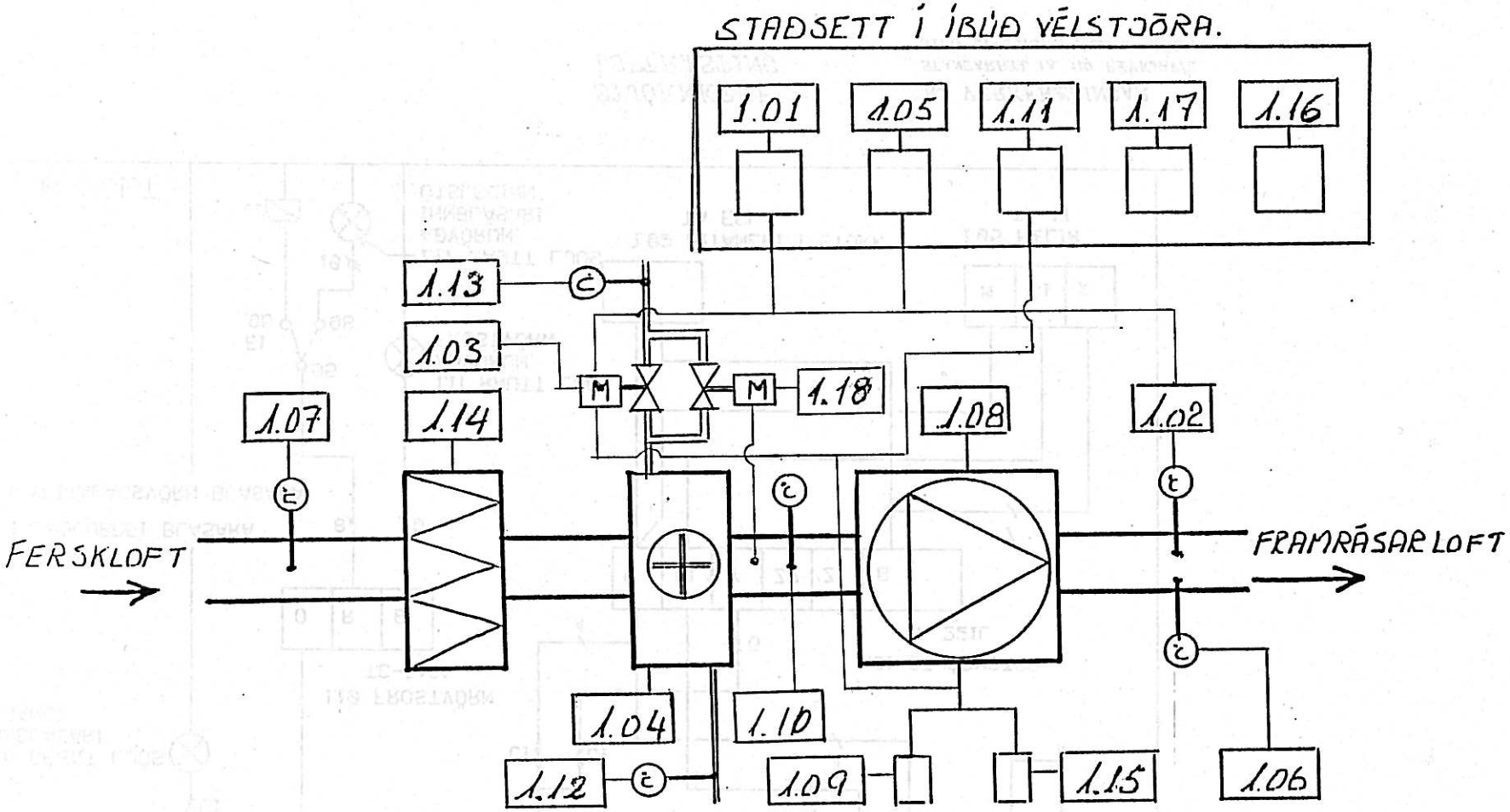
Handbók

fyrir
loftræstikerfi

Loftræstiþjónustan

Boðtæki: 984-54688
Sími: 91-673328
Fax: 91-814162

Reykjavík í janúar 1994

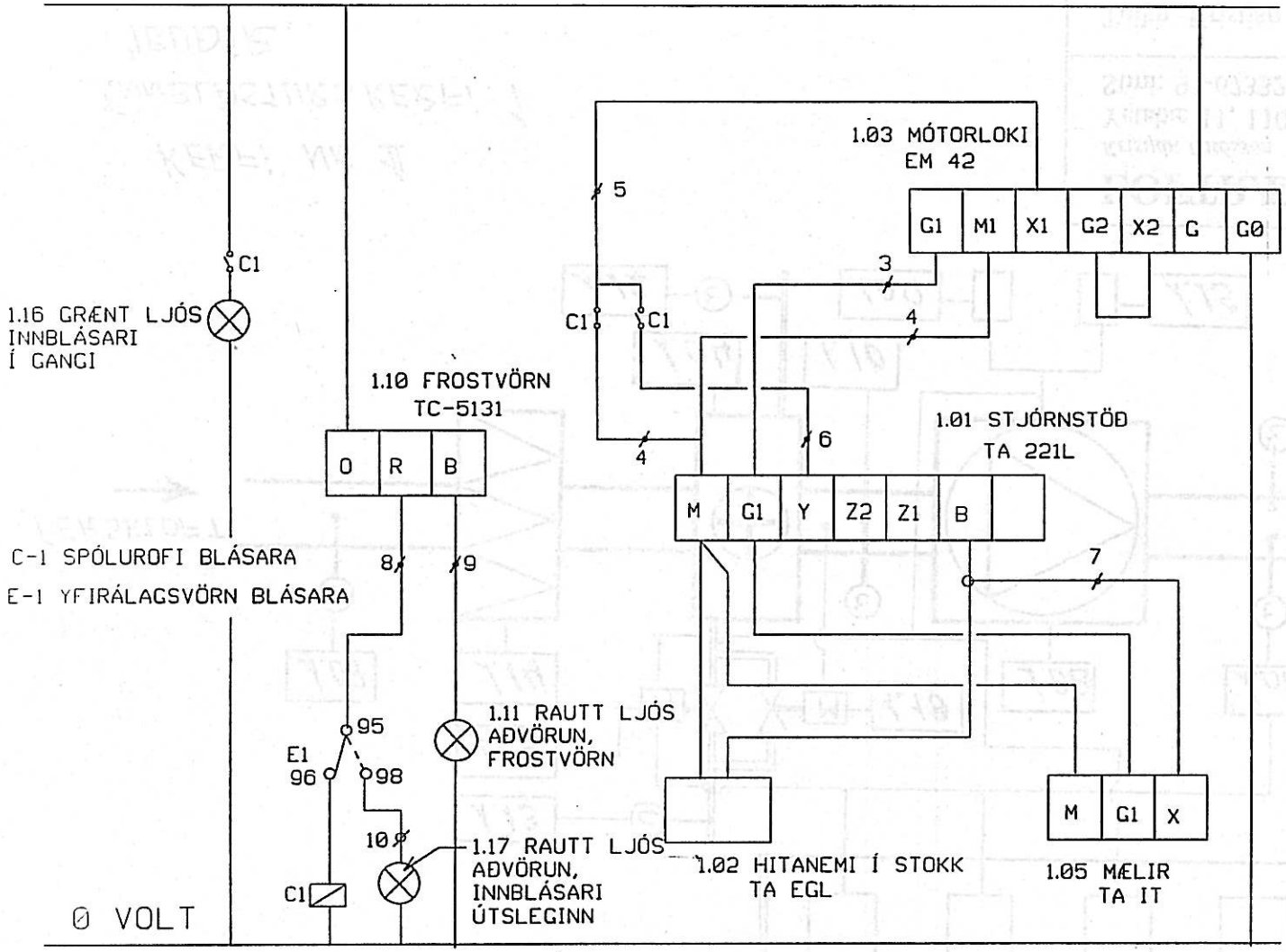


KERFI NR 11
INNBLÁSTURSKERFI Í
ÍBÚÐIR.

LOFTRÆSTIÞJÓNUSTAN
Kristján Ottósson
Ystabæ 11, 110 Reykjavík
Sími: 91-673328 Boðtæki: 984-54688

Teikn. Kristján Ottósson 15. 01. 1994

DALA RAFN VE 508



STJÓRNKERFI
LOFTRÆSTING

RJ VERKFRÆÐINGAR
STANGARHYL 1A, 110 REYKJAVÍK
Sími 91-681507, Fax: 91-678015

DALA RAFN VE 508 Sími: 98-12720 Farsími: 985-22249 / 985-22849 Fax: 98-12721

Lýsing á samvirkni tækja.

Loftræstikerfi nr. 1

Loftræstikerfi fyrir íbúðir.

NR:	TÆKI:	HLUTVERK:
1. 01.	Stjórnstöð	(TA 221L) fyrir hitagjafa (1.04.) staðsett í íbúð yfirvélstjóra, stjórnar (1.03.) eftir skipun frá (1.02.) **Stillist á 18 - 20 gráður.**
1. 02.	Stokkhitanemi	(AT EGL) í loftstokk innan við samstæðu í framrásarlofti, sendir boð til (1.01.) og (1.05).
1. 03.	Mótorloki	(EM 42) í miðstöðvarvatni að (1.04.) í blásaraklefa, gefur heitt vatn til (1.04.) eftir boðum frá (1. 01.)
1. 04.	Hitagjafi	í samstæðu í blásaraklefa, stjórnast af (1.03.). (stærð ljósmál 80 x 60 h 16 sentemeter)
1. 05.	Hitamælir	(TA IT) aflestur á hitastigi framrásarlofts fyrir íbúðir, staðsettur í íbúð yfirvélstjóra, fær boð frá (1.02.), á að sýna sama hitastig lofts og (1.01.) er stillt á.
1. 06.	Hitamælir	í blásaraklefa, í stokk framrásarlofts frá samstæðu, sýnir hitastig á framrásarlofti, mælir hitastig á sama stað og (1.02.)
1. 07.	Hitamælir	í ferksloftsinntaki, ofan á samstæðu í blásaraklefa, mælir sama hitastig og er úti hverju sinni.
1. 08.	Innblásari	(D 970 D 17 - 4) staðsettur í samstæðu í blásaraklefa, stjórnast af tæki (1.09.).
1. 09.	Rofi	staðsettur í raftöflu í blásaraklefa stjórnar (1.08.)

LOFTRÆSTIÞJÓNUSTAN Sími: 91-673328 Boðtæki: 984-54688 Fax: 91-814162

1. 10.	Frostvörn	(TC - 5131) staðsett í samstæðu í loftrás innan við (1.04.): Ef lofthitastig í samstæðu fer niður í innstillt gildi, **gerist eftirfarandi:** Slekkur á innblásara (1.08.), opnar mótorloka (1.03.) og setur rauttljós á (1.11.). **Stillist á + 5 gráður.**
1. 11.	Aðvörun	rautt logandi ljós, staðsett í íbúð yfirvélstjóra, merkir frostvörn (1.10.) útslegin,
1. 12.	Hitamælir	í bakrás miðstöðvar-vatns sýnir hitastig á bakrás.
1. 13.	Hitamælir.	í framrás miðstöðvar-vatns sýnir hitastig á framrás.
1. 14.	Síur	í samstæðu í blásaraklefa. Stærð 60 x 60. **Skipt út reglulega - Minnst tvisvar á ári.**
1. 15.	Öryggi	fyrir loftræstikerfi staðsett í raftöflu í blásaraklefa.
1. 16.	Grænt ljós	logandi, staðsett í íbúð yfirvélstjóra, merkir innblásari í gangi.
1. 17.	Rautt ljós	logandi, staðsett í íbúð yfirvélstjóra, innblásari útsleginn v/yfirálags.
1. 18.	Frostvörn	Sjálfstýrður Danfossloki staðsettur í miðstöðvarvatni, í slaufu framhjá mótorloka (1.03.) stýrist af hitaþreifara í samstæðu, í loftrás innan við hitara (1.04.), sér um að vatnshiti í hitagjafa (1.04.) fer ekki niðurfyrir 10 C **(10 gráður = Stillist á 0)**

TA 221L

AIR HANDLING – ONE OUTPUT

C-31-5

January 1982

The TA 221L is a controller in the Control 80 system which has been designed for the control of the supply air temperature in one stage.

The output signal is a 2–10V control signal which can control one or several electronic actuators.

Set point adjustment is carried out directly on the cassette.

The set point can also be displaced upward and downward with an external control voltage connected to the SPC-input.

The TA 221L occupies one module on the terminal block.

The TA 221L is supplied with 16V DC.

TECHNICAL DATA

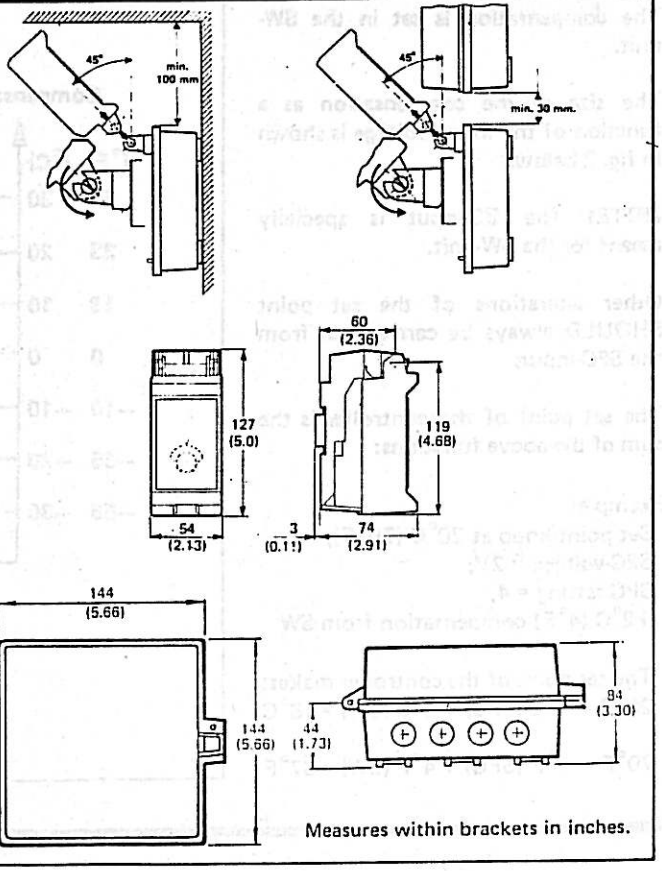
Part number:
- With °C scale 221-1030-800
- With °F scale 221-1032-800

Supply voltage . . . . . 16V DC
Supply current . . . . . 10 mA
Ambient temperature:
- Operation . . . . . min. 0°C (32°F) max. 50°C (122°F)
- Storage . . . . . min. –40°C (–40°F) max. 50°C (122°F)

Ambient humidity . . . . . max. 90% RH
Weight . . . . . 0.1 kg (0.22 lbs)
Size . . . . . 1 module
Control function . . . . . PI
Control output Y:
- Output voltage . . . . . 2–10V direct action
- Load . . . max. 10 control outputs, short-circuit proof

Type of temperature sensor . . . . . thermistor
Control inputs Z . . .:
- Permitted control voltage . . . . . 0–16V DC
- Input current . . . . . max. 0.1 mA

Also see leaflet C-01-5 (5-01-5) for detailed information regarding the design of the Control 80 system.



Measures within brackets in inches.

SET POINT DISPLACEMENT

The set point adjusted can be displaced upward and downward by means of a control voltage connected to the Z1-input (SPC).

The size of the displacement can be adjusted continuously by means of the SPC knob, scaled from 0 to 32.

Position 0 gives no displacement whereas position 32 gives maximum displacement. Fig. 1 illustrates the size of the displacement as a function of the input voltage at three different settings of the SPC.

When no displacement voltage is connected, the input will be at 6V. The displacement will be 0, no matter which setting of the SPC.

The input voltage may vary between 0 and 16V.

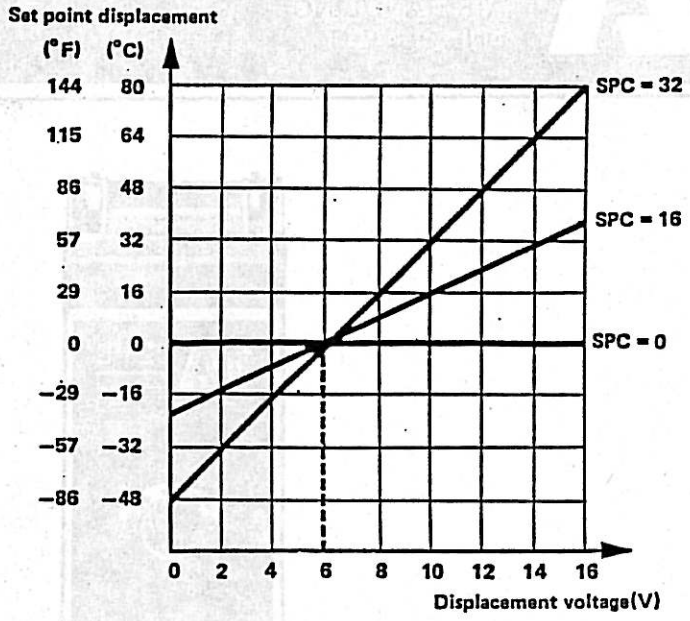


Fig. 1

When summer/winter compensation is required, a SW-unit is used, which is connected to the Z2-input on the TA 221L.

The compensation is set in the SW-unit.

The size of the compensation as a function of the input voltage is shown in fig. 2 below.

NOTE! The Z2-input is specially meant for the SW-unit.

Other alterations of the set point SHOULD always be carried out from the SPC-input.

The set point of the controller is the sum of the above functions:

Example:
Set point knob at 20°C (70°F),
SPC-voltage = 2V,
SPC setting = 4,
+2°C (4°F) compensation from SW

The set point of the controller makes:
20°C − 4°C (SPC) + 2°C (SW) = 18°C

70°F − 7°F (SPC) + 4°F (SW) = 67°F

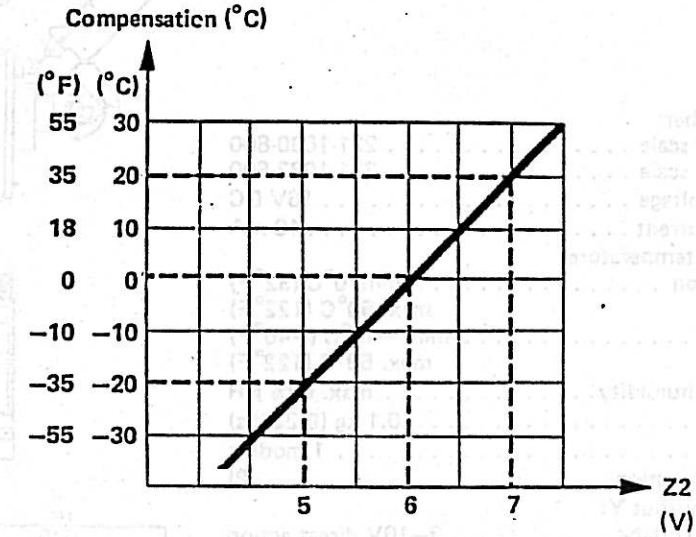
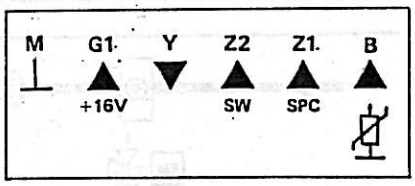


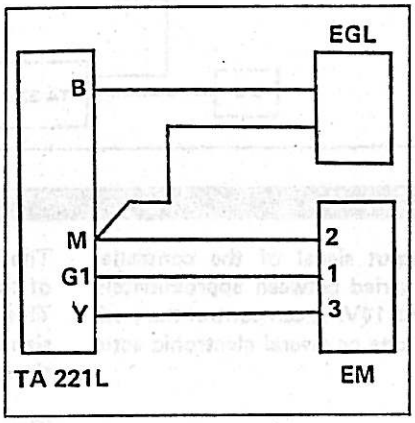
Fig. 2

ELECTRICAL INSTALLATION

Connections on the terminal block:

M	Measuring ground
G1	16V supply
Y	Control output
Z2	SW input
Z1	SPC input
B	Sensor input





Length of cables

Maximum 200 m (600 ft) of 0.5 sq. mm (AWG 20) to all connections.

MAINTENANCE

The units included in the Control 80 system are maintenance-free.

However, the units should be kept dry and cleaned externally when necessary.

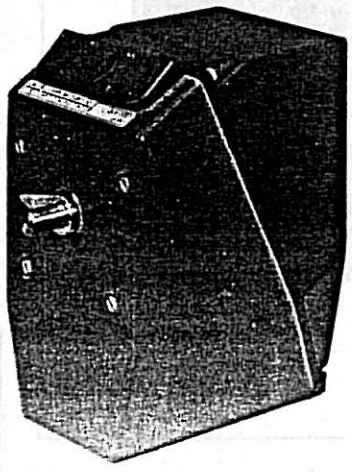
Function tests should be carried out once a year.

ASSECCORIES

Mounting kit for mounting of a terminal block unit on a 35 mm DIN rail:
Part number: 912-1140-000

Mounting kit for flush panel mounting of a case:
Part number: 912-1120-000

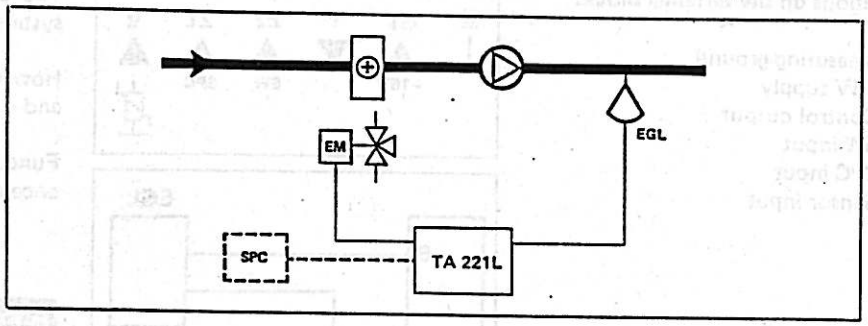
Padlock:
Part number: 080-4020-000



Power to the TA 221L is supplied by an EM-motor.

APPLICATION

- Complete controller in simple air-conditioning plants.
- Maximum or minimum limiting of the supply air temperature.
- Zone controller in larger air-conditioning plants.



FUNCTION

The TA 221L is a PI-controller in which P- and I-action can be set individually. The output signal of the controller is expressed in the formula below:

$$u(t) = 6V + \underbrace{\frac{8V}{P\text{-band}}\,e(t)}_{P} + \underbrace{\frac{1}{Ti}\int e(t)\,dt}_{I}$$

u(t) = output signal in V
e(t) = control deviation (set point – measuring value) in °C
Ti = time of integration

The output signal of the controller can be varied between approximately 0.5V and 14V. It can control the position of one or several electronic actuators.

The output signal is normally within the operating range of the actuator, which is 2–10V maximum. Therefore the P-band of the controller is defined within this range.

Thus, a P-band of 10°C means, for example, that a temperature change of 10°C is required to alter the output signal from 2–10V.

The integrating part is sensing the size of the control deviation and duration. This gives a contribution to the output signal so that a possible control deviation remaining is eliminated.

The output signal has direct action, which means that 2V corresponds to maximum and 10V to minimum heat load. If the reverse function is required, the switching-over is done on the actuator.

When the supply voltage is connected, the output signal always starts at 6V, which corresponds to the mid-travel of the actuator.

ADJUSTMENTS

On the front:

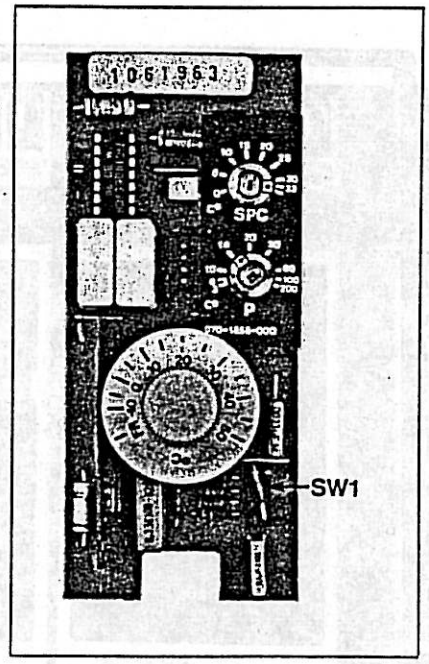
Set point supply air temperature.
Control range: –10 to 50°C (20 to 125°F)

On the circuit card:

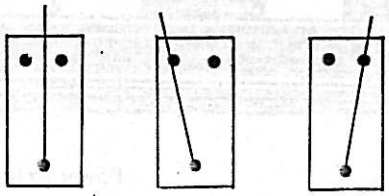
SPC:
(Set Point Control). Action from remote set point displacement signal. The set point value is indicating the increase of set point at 10V displacement voltage (in °C).
Setting range: 0 to 32
Setting from factory: 32

P:
Proportional range for the controller. The set point value is indicating the changing of the supply air temperature to cause an output signal change of 2 to 10V.
Setting range: 2 to 200°C (4 to 360°F)
Setting from factory: 10°C (20°F)

SW1 jumper:
Setting of the integration time.
Jumper open = 1 min.
Jumper in left position = 3 min.
Jumper in right position = 9 min.
Setting from factory: 3 min.



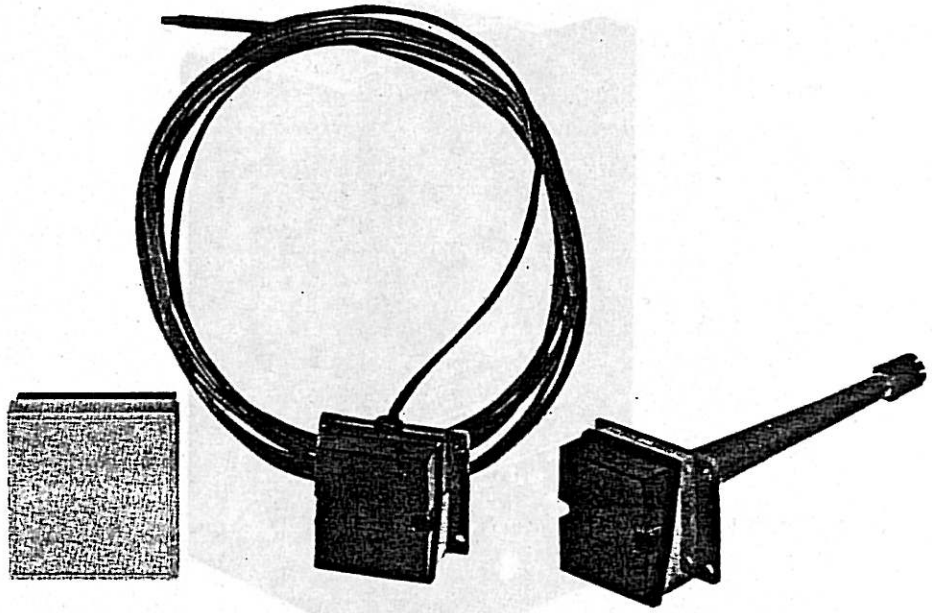
SW1 is placed in the lower right corner on the circuit card.



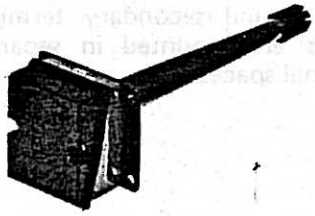
EGL, EGRL, EGXL 3 D-11-25

Thermistor type sensors

September 1984



DUCT MOUNTED TEMPERATURE SENSOR, TYPE EGL, EGLL



Both the EGL and EGLL are for duct insertion.

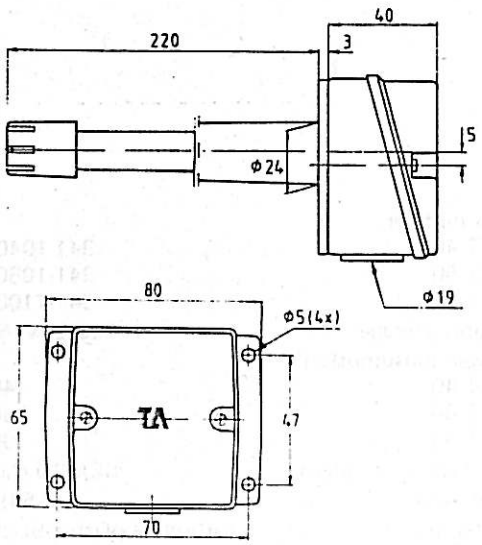
The EGLL has two separate thermistors.

Electrical connection: Ø 19 mm hole for conduit entry Pr. 18.6.

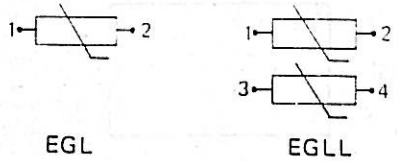
TECHNICAL DATA

Part number:

EGL	511-1120-000
EGLL	511-2120-000
Ambient temperature, operation	min. –40°C
	max. 100°C
Time constant	approx. 120 seconds (1.5 m/s)
	approx. 100 seconds (3.0 m/s)
Enclosure	IP 54
Material:	
Case	carbonate plastic, red
Cover	carbonate plastic, black
Duct pipe	carbonate plastic, red
Weight	140 g



WIRING DIAGRAM



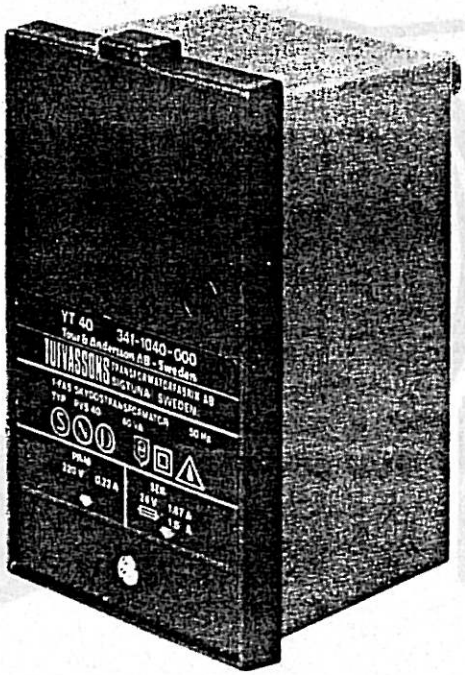
EGL EGLL

YT 40, 60, 96

External transformer

E–45–5

November 1983



YT is a plastic moulded transformer for wall mounting.

The transformer is double-isolated and it does'nt need to be connected to earth.

Primary and secondary terminal blocks are mounted in separate terminal spaces.

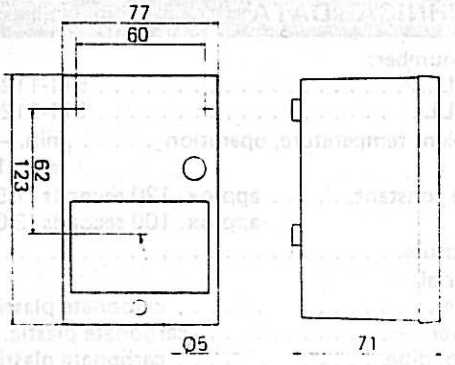
The transformer has a built-in fusing.

TECHNICAL DATA

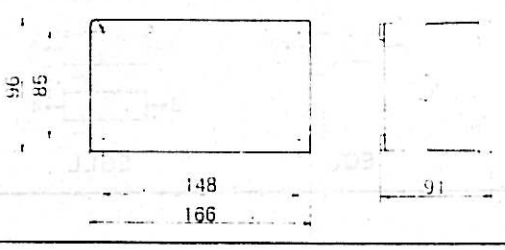
Part number:

YT 40	341-1040-000
YT 60	341-1060-000
YT 96	341-1100-000
Supply voltage	220/24V, 50 Hz
Power consumption:	
YT 40	40 VA
YT 60	60 VA
YT 96	96 VA
Production standard	SEMCO classe II
Enclosure	(IP 54) S 43
Material	carbonate plastic, black/red
Weight:	
YT 40	1.1 kg
YT 60	1.2 kg
YT 96	3.4 kg

YT 40, YT 60



YT 96

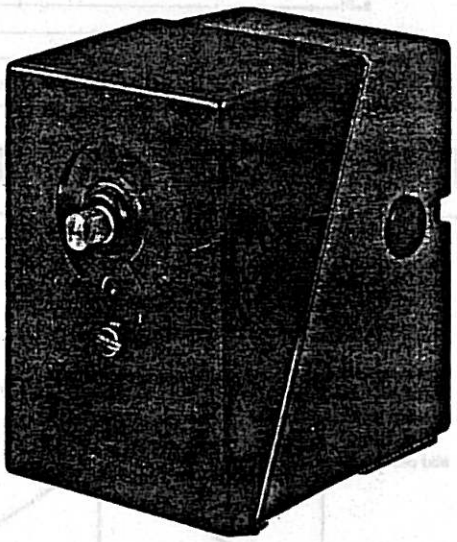


EM42

ACTUATOR FOR VALVES AND DAMPERS

G–11–15

May 1982



The EM42 is an electronic actuator for the control of dampers and small valves up to a size DN 32. The actuator can also be used for mixing valves.

The actuator is designed for 24V, 50–60 Hz supply, and its position is normally controlled by a DC voltage between 2–10V, but can also operate of a 4–20 mA DC signal.

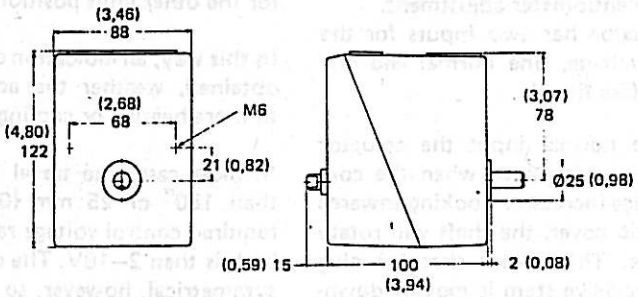
The EM42 has a 16V DC output for the voltage supply of smaller controllers and auxiliary units in the Control 80 system.

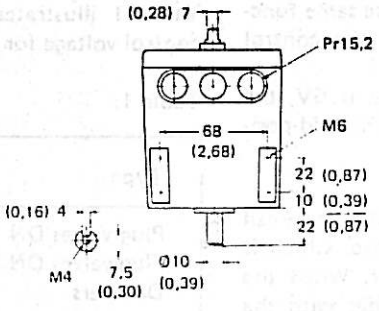
Mechanical data such as torque, dimensions, etc., are equal to the M42 controller.

The actuator can be provided with manual operation device.

TECHNICAL DATA

Part number	841-2000-000
Supply voltage	24V –10% +20%, 50–60 Hz
Power consumption	5 VA
Ambient temperature:	
Operation	min. –20°C (–4°F)
	max. 50°C (122°F)
Storage	min. –40°C (–40°F)
	max. 85°C (185°F)
Ambient humidity, operation	max. 90% RH
Material of enclosure	aluminium, polycarbonate
Protection	IP 54
Weight	1.5 kg (3.3 lbs)
Colour	red/grey
Running time	approx. 60 sec. for 180°
Torque	2.5 Nm (22 lb in)
Thrust	250 N (56 lbs)
Output	16V DC, 25 mA
Control signal	2–10V DC or 4–20 mA DC

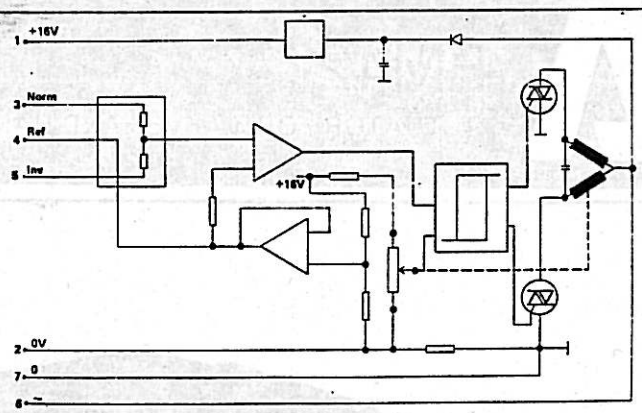




Measures within brackets in inches

DESIGN

The EM42 comprises a reversible 24V synchronous motor with a gearbox and an electronic unit. The electronic unit contains, among other things, micro switches, feed-back potentiometer and terminal block.
The electronic unit is easily interchangeable.



Block diagram of the EM42 actuator. Fig. 1

FUNCTION

The EM42 is controlled by a continuous voltage between 2 and 10V, so that a certain voltage always corresponds to a certain position of the actuator. The voltage range 2–10V is equal to the torsional travel of 180° on the output shaft..

The EM42 has no fixed limit positions, but the travel is determined by the end positions of the valve or damper connected. At such a limit position, the nominal torque of the actuator is exceeded, and a limit switch breaks the current to the motor, and the actuator stops.

Plug valves with linear stem motion are operated with a rack, which converts a 180° torque into a travel of 25 mm (0.98 in).
The motion of the actuator must always be limited to restrict the travel to 180° or 25 mm, preventing the risk to the potentiometer adjustment.
The actuator has two inputs for the control voltage, one normal and one inverted (see fig. 2).

With the normal input the actuator rotates towards minus when the control voltage increases. Looking towards the plastic cover, the shaft will rotate clockwise. This means that for plug valves the valve stem is moving downwards.

With the inverted input the same functions are achieved when the control voltage decreases.
When the control voltage is 6V, the actuator always stops in the mid-position of the travel.

The actuator position in the travel can be read off the white disc, which is visible through the cover. When the index of the disc coincides with the

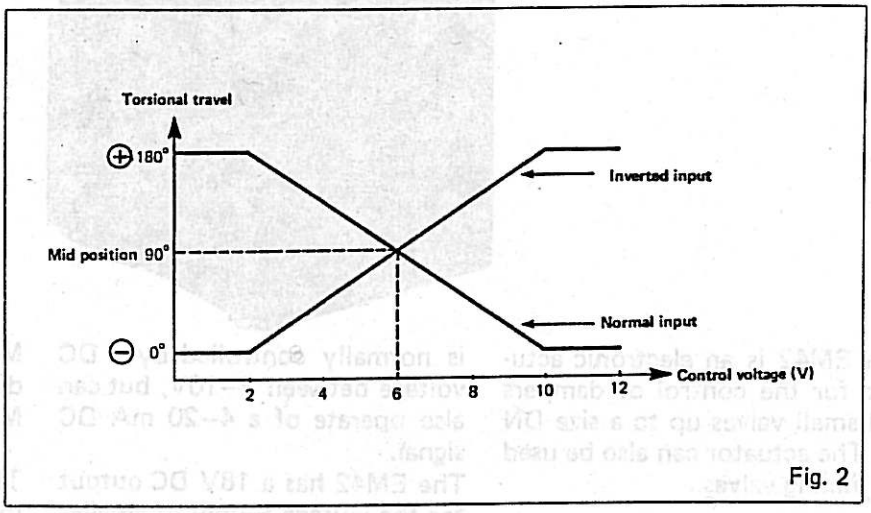


Fig. 2

firm index in the cover, the actuator is in mid-position. The red peg is set so, that it corresponds to the index of the cover, when the actuator is in the limit position, which supplies the most heat. The blue peg is set in a similar way, but for the other limit position.

In this way, an indication can always be obtained, weather the actuator turns to more heating or cooling.

In most cases the travel becomes less than 180° or 25 mm (0.98 in). The required control voltage range will then be less than 2–10V. The diminution is symmetrical, however, so that 6V still corresponds to the mid-position.

Table 1 illustrates the dimension of control voltage for various valve sizes.

After the actuator is assembled with either a valve or a damper, it can be set to the respective limit position by connecting no. 1 (16V) and no 2 respectively (0V) on the terminal block to the control input.

If the control input is not connected the input will be 6V, and the actuator turns to its mid-position.

By connecting a 500 Ohms resistor between the control input and 0V the actuator can be operated with a current between 4–20 mA. 4 mA corresponds to 2V and 20 mA to 10V.

Table 1.

Type	Travel	Control voltage
Plug valves DN 15	15 mm (0.59 in)	3.6 – 8.4V
Plug valves DN 20 – 32	20 mm (0.79 in)	2.6 – 9.2V
Dampers	160° rotating motion	2.4 – 9.6V

MOUNTING KITS

For plug valves of the V280, V290, V380 and V390 series.

Plug valves, size DN 15, will be supplied with the actuator assembled or the valve and actuator separate. See ordering example a) and b) below.
Mounting kit no. 911-1480-000.

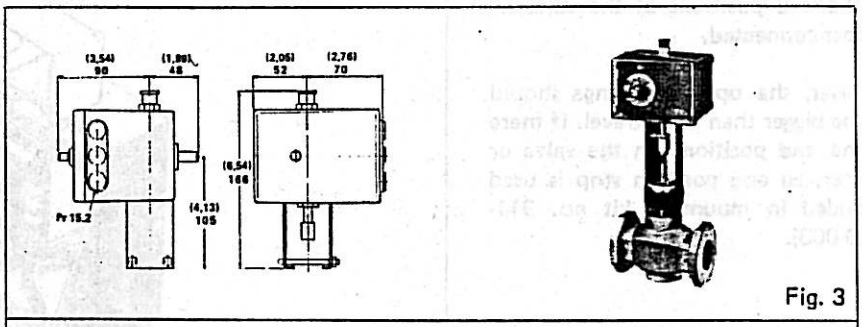


Fig. 3

Plug valves, sizes DN 20–32, will be supplied with the actuator assembled or the valve and actuator separate. See ordering example a) and b) below.
Mounting kit no. 911-1080-000.

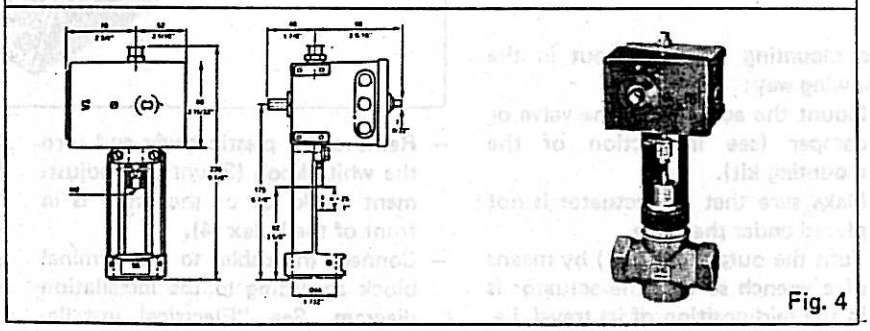


Fig. 4

For slide valves of the STM, VTR and VTRA type.

Slide valves, sizes DN 15–32, will be supplied with the actuator and valve separate according to ordering example b) below.
Mounting kit no. 911-1520-000.

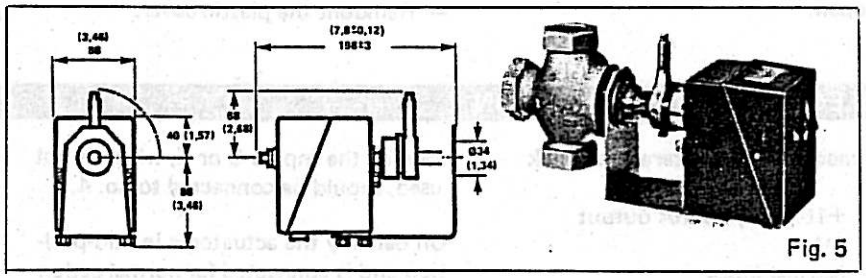


Fig. 5

For dampers.

Actuator and mounting kit will be supplied separately according to ordering example b) below.
Mounting kit no. 911-1740-000.

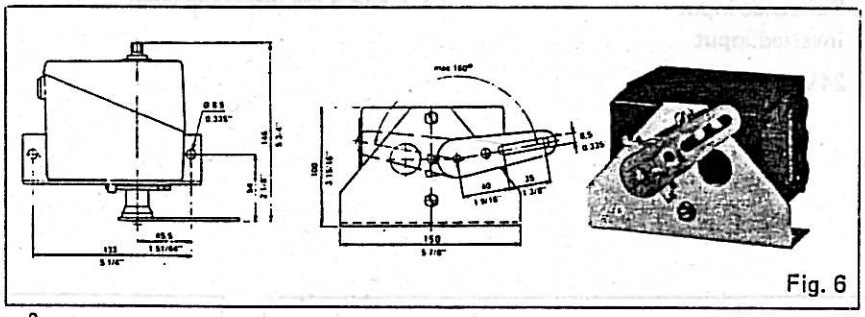


Fig. 6

End position stop for a travel of 90° and 180°.

Actuator and end position stop will be supplied separately according to ordering example b) below.
End position stop:
Part number 911-1690-000.

End position stop is needed when mounting kit is not used.

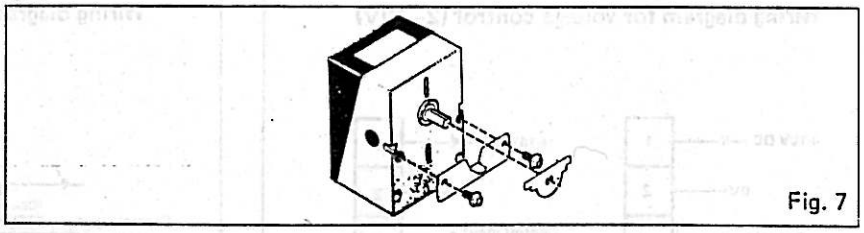


Fig. 7

ORDERING EXAMPLES

a) Control device (actuator + valve) EM42/V282/DN 15/k_{VS} 0.25

Designation of actuator

Designation of valve

Actuator and valve are assembled and adjusted when delivered.

b) Actuator + valve + mounting kit.

EM42 . . . . . Part number 841-2000-000
V282/DN 15/k_{VS} 0.25 . . . . . Part number 721-8206-000
Mounting kit . . . . . Part number 911-1480-000
Products will be delivered unassembled. Mounting instruction is enclosed.

MOUNTING

The EM42 has no fixed limit positions, but the operating range is determined by the end positions of the valve or damper connected.

However, the operating range should not be bigger than 180° travel. If there are no end positions on the valve or damper, an end position stop is used (included in mounting kit no. 911-1690-000).

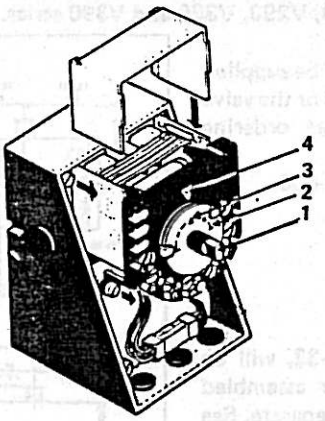


Fig. 8

The mounting is carried out in the following way:

- Mount the actuator to the valve or damper (see instruction of the mounting kit).
  Make sure that the actuator is not placed under the valve.
- Turn the output shaft (1) by means of a wrench so that the actuator is in the mid-position of its travel, i.e. the valve or damper should be half-open.
- Remove the plastic cover and turn the white knob (2) until the adjustment mark (3) of the knob is in front of the index (4).
- Connect the cables to the terminal block according to the installation diagram. See "Electrical installation" below.
- Remount the plastic cover.

MAINTENANCE

The bearings of the electric motor and the gear train are self-lubricating, and hence the actuator is maintenance free for normal operation.

However, the actuator must be kept dry and cleaned externally, if necessary.

ELECTRICAL INSTALLATION

Connections on the terminla block

1. +16V DC, 25 mA output
2. 0V
3. Normal input
4. Reference input
5. Inverted input
6. 24V, 50–60 Hz
7. 24V, 50–60 Hz

One of the inputs 3 or 5, which is not used, should be connected to no. 4.

On delivery the actuator is in mid-position and is connected for normal action i.e. 4 and 5 are interconnected.

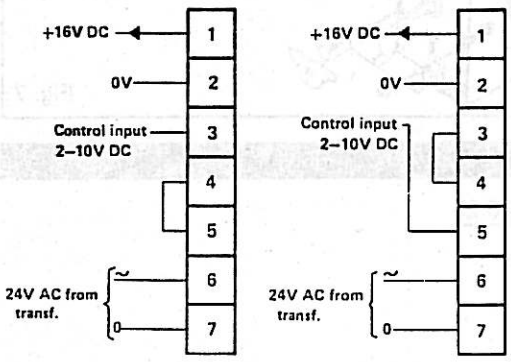
Length of cables

The cable to the controller should be min. 0.5 sq. mm (AWG 20) and max. 1000 m (3000 ft).

The cable to the transformer should be min. 0.5 sq. mm (AWG 20) and max. 30 m (90 ft), or min. 1.5 sq. mm (AWG 16) and max. 100 m (300 ft).

The EM42 has threaded socket outlets for three compression glands Pr 15.2 conduit entries.

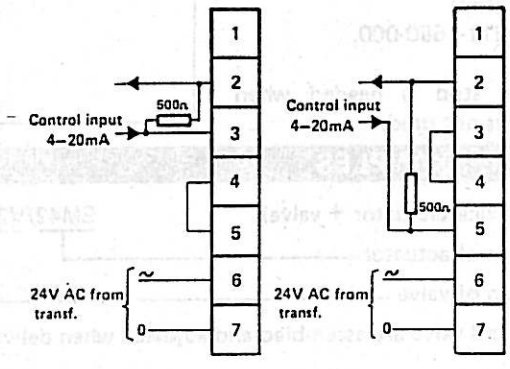
Wiring diagram for voltage control (2–10V)



Normal action Inverted action

Fig. 9

Wiring diagram for current control (4–20 mA)



Normal action Inverted action

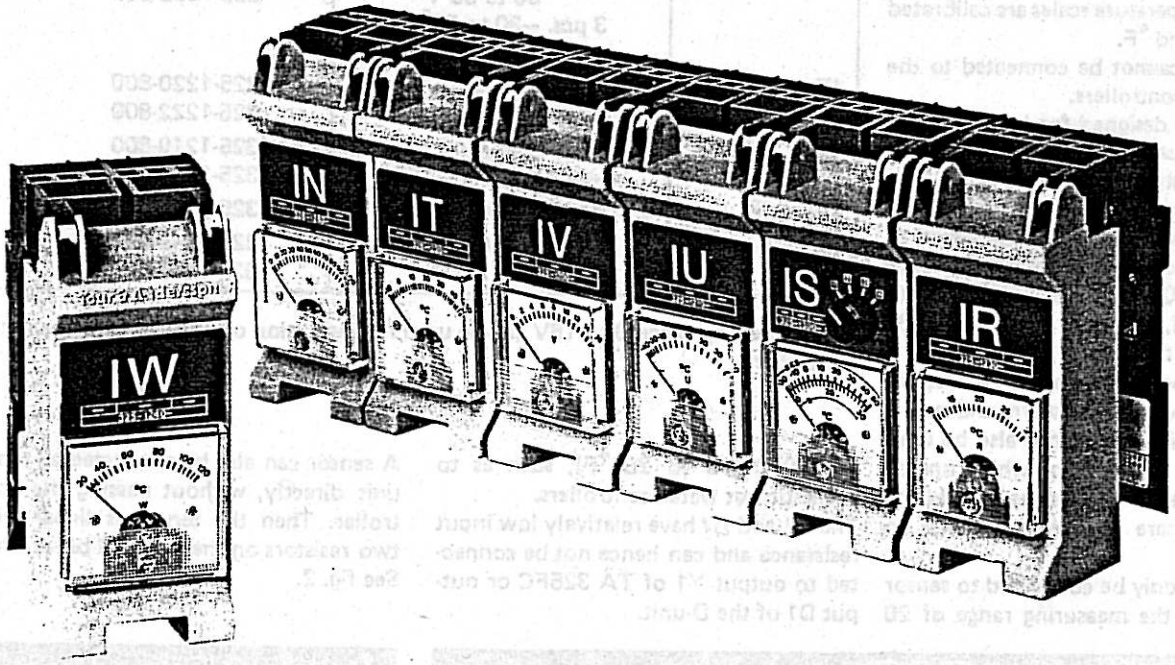
Fig. 10

IN, IR, IS, IT, IU, IV, IW

E-46-40

Indication units

February 1985



The I-units are auxiliary units in the C 80 system.

IR, IS, IT, IU and IW displays the temperature from a sensor of thermistor type.

IV displays voltage within a measuring range of 0—16V.

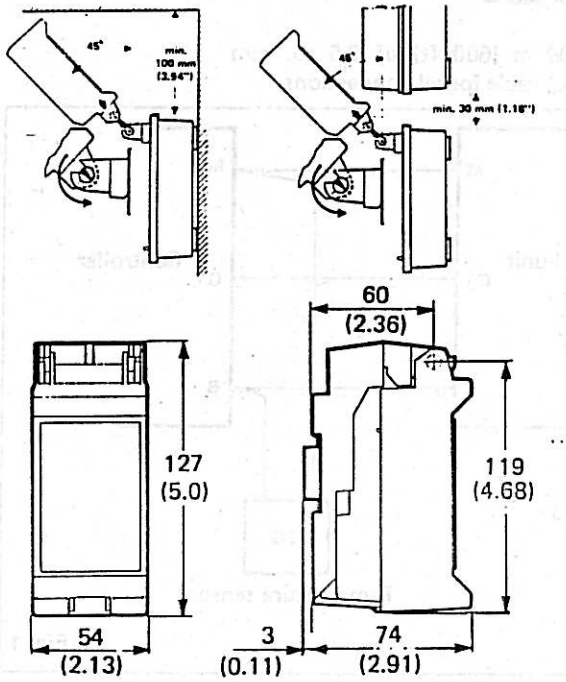
IN has primarily been designed for the heat recovery efficiency guard TA 325N and displays the efficiency in %.

The I-units occupies one module on the terminal block.

TECHNICAL DATA

Part number	See table 1
Supply voltage	16V DC ± 0.3V (Not valid for IN and IV)
Supply current	5 mA (Not valid for IN and IV)
Ambient temperature:	
Operation	min. 0°C (32°F) max. 50°C (122°F)
Storage	min. –40°C (–40°F) max. 50°C (122°F)
Ambient humidity	max. 90% RH
Measuring accuracy	±2.5% of the measuring range
Input resistance on X:	
IV	16 K Ohm
IN	10 K Ohm
Others	1 M Ohm
Weight	0.1 kg (0.22 lbs)
Size	1 module

Also see leaflet C-01-5 (5-01-5) for detailed information regarding the design of the Control 80 system.



Measures within brackets in inches.

FUNCTION

The I-unit is connected in parallel with a sensor, which is connected to a B input of a controller, and measures the voltage. See fig. 1.

This voltage is proportional to the temperature within a wide temperature range. The I-unit amplifies this voltage which is applied to the integral moving coil meter. The temperature scales are calibrated in both °C and °F.

The I-units cannot be connected to the TA heating controllers.

IN has been designed for heat recovery efficiency guard TA 325N and displays the temperature efficiency in %. This corresponds to 0 to 10V DC input.

IR, IS, IT and IU can be connected to sensor inputs having a measuring range of −40 to 50°C (−40 to 120°F), i.e. to the TA 218, TA 221 and Control 80 auxiliary units.

The IS has been designed to be adapted in connection with the alarm and supervision unit TA 800, it can also be used off-line. For selection of which one of the four measuring values should be displayed, there is a rotary switch on the front.

The IW can only be connected to sensor inputs with the measuring range of 20 to 120°C (70 to 250°F), such as to domestic hot water controllers.

The IN and IW have relatively low input resistance and can hence not be connected to output Y1 of TA 325FC or output D1 of the D-unit.

The following measuring ranges are available:

Type of unit	Measuring range	Part number
IN	0 to 100%	325-1280-800
IR	10 to 30°C	325-1230-800
	50 to 85°F	325-1232-800
IS	1 pc. 10 to 30°C	325-1300-800
	50 to 85°F	325-1302-800
	3 pcs. −30 to 50°C	
	−20 to 120°F	
IT	−10 to 50°C	325-1220-800
	20 to 120°F	325-1222-800
IU	−40 to 40°C	325-1210-800
	−40 to 100°F	325-1212-800
IV	0 to 16V DC	325-1200-800
IW	20 to 120°C	325-1240-000
	70 to 250°F	325-1242-000

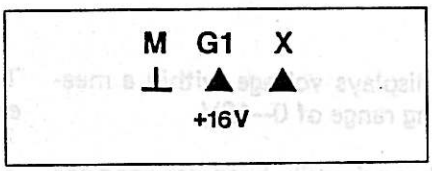
The measuring range 0 to 16V can be used for indication of a control voltage in the controller.

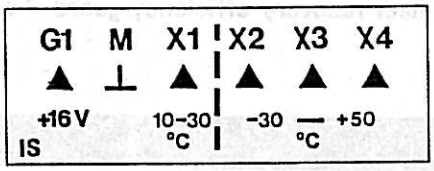
A sensor can also be connected to the I-unit directly, without passing the controller. Then the sensor is linear with two resistors on the terminal block unit. See fig. 2.

ELECTRICAL INSTALLATION

Connections on the terminal block

M Measuring ground
G1 +16V DC supply (Not valid for IV and IN)
X Measuring input
X1 Measuring input 10 to 30°C *
X2, X3, X4 Measuring input −30 to 50°C *
*Only valid for IS.





Lenght of cables

Max. 200 m (600 ft) of 0.5 sq. mm (AWG 20) cable for all connections.

MAINTENANCE

The units included in the Control 80 system are maintenace-free.

However, the units should be kept dry and cleaned externally when necessary.

Function tests should be carried out once a year.

ACCESSORIES

Mounting kit for mounting of a terminal block unit on a 35 mm DIN rail or equivalent:
Part number: 912-1140-000

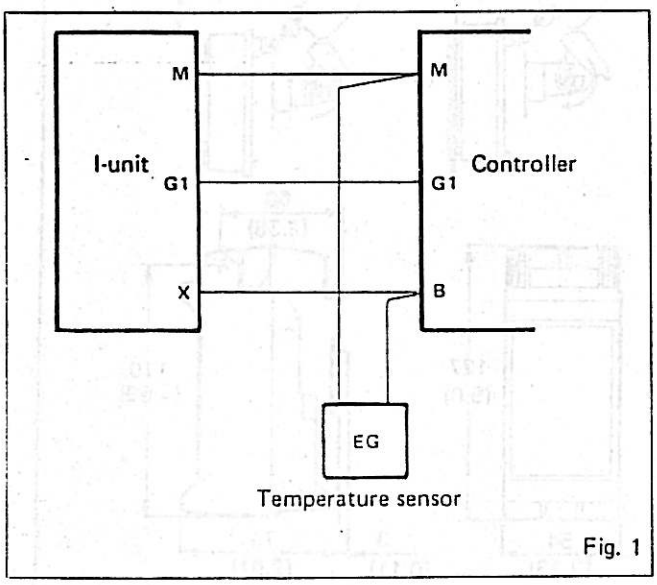


Fig. 1

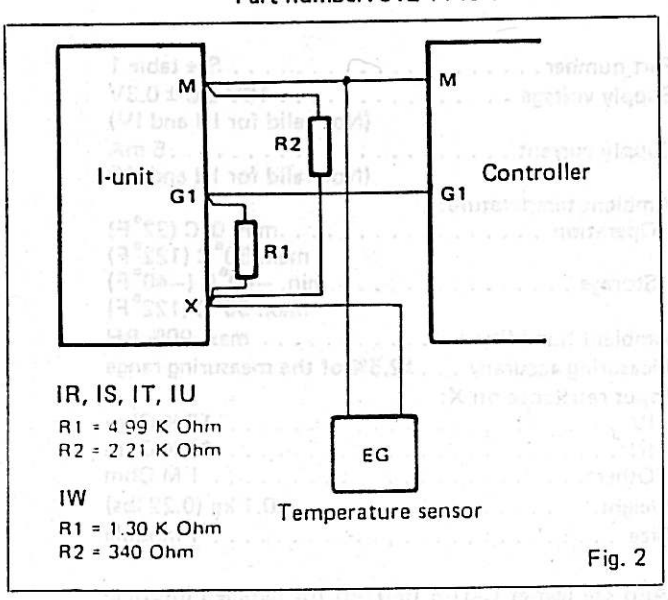


Fig. 2