



REFRIGERANT LEAK MONITOR KIT 6CH

Installation & Service guide for
HFC/HFO gas detectors
in marine applications

Refrigerant leak monitor kit 6 channels

Table of Contents

1.	FEATURES	3
2.	WIRING DIAGRAMS	5
3.	FUNCTION	8
4.1	AUTO/MANUAL ALARM RESET	9
4.2	ALARM TIME DELAY (T1)	9
4.3	RESET/TEST/SERVICE-BUTTON (7)	9
4.3.1	TEST MODE	9
4.3.2	SERVICE MODE.....	9
4.3.3	FAULT MODE	9
4.4	INTERNAL BUZZER AND 24VDC AUXILIARY OUTPUT	10
4.5	REMOTE DETECTORS	10
5	LOCATION/INSTALLATION.....	11
5.1	ALARM LEVELS / CHANGING ALARM LEVELS	12
5.2	FUNCTION CONTROL.....	13
6	TROUBLESHOOTING.....	14
	When we are troubleshooting, we recommend checking these following steps.....	14
7	CLAIM/WARRANTY PROCEDURE	15
8	APPENDIX 1	16

1. FEATURES

The refrigerant Leak Monitor Kit 6CH offer an ideal solution for multipoint surveillance of machinery room and walk-in freezer rooms where refrigerant gases may be present. The kit is supplied with

- 1 x Monitoring Unit MPU6C
- 4 x Detector New MP-DS-HFC-4000 (product number: 708042)
- 1 x Red combined flash / siren FL-RL-R
- 2 x 100m halogen free cable 3x0.75mm²

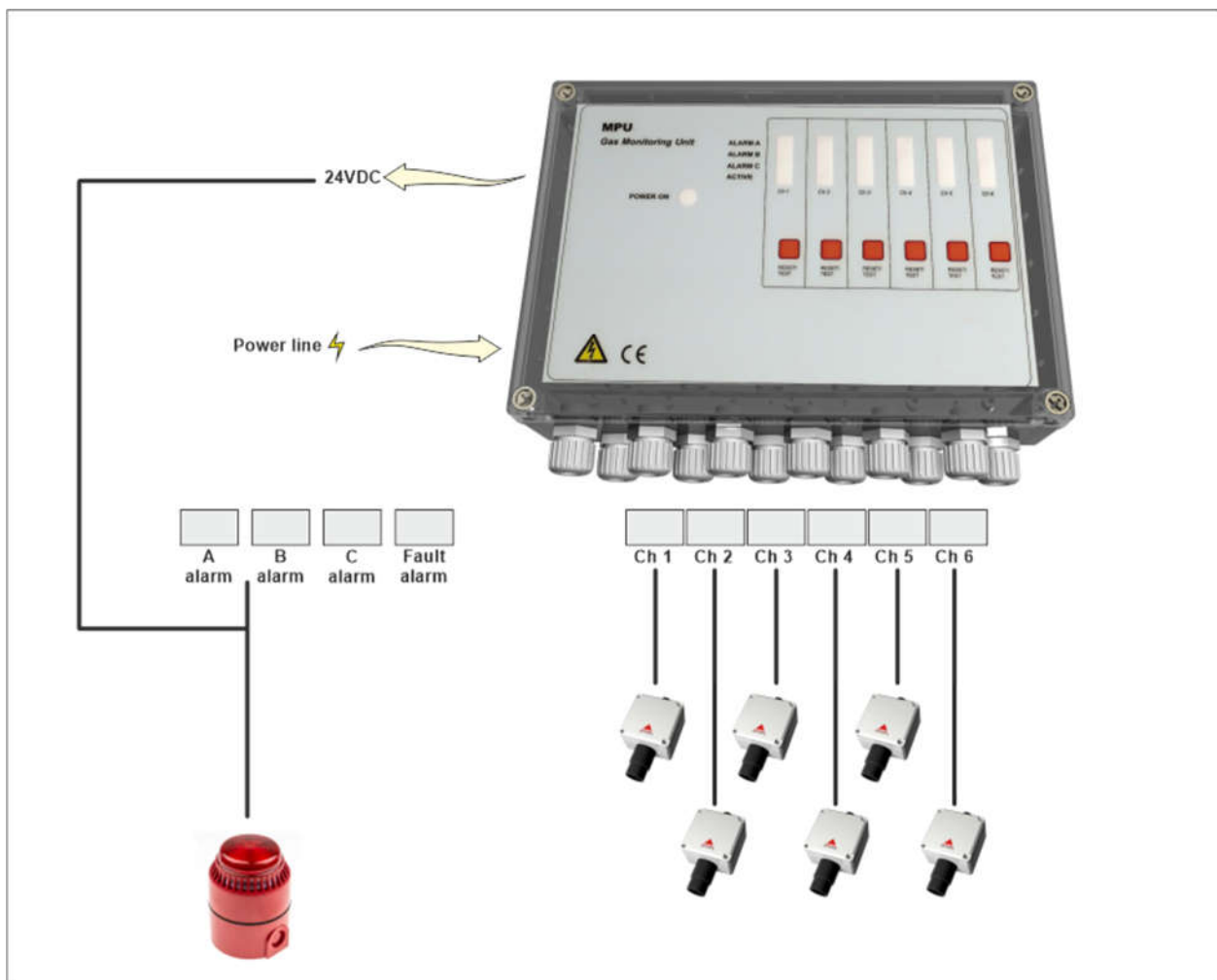


Fig. 1

Functional diagram

- The monitoring unit MPU6C can be connected to up to 6 detectors. It can display operating status and alarm information independently for each channel via LEDs. They are suitable for monitoring all HFC and HFO refrigerants.
- The 4 x New MP-DS-HFC-4000 detectors are equipped with the new SEN027 Self Sense sensor. Additional 2 detectors can be purchased separately to fully utilize all channels in MPU6C if required. Once connected, they will continuously measure the gas concentration and provides an analogue signal to the central unit.

Other features include:

- User configurable Alarm time delays.
- Manual/auto alarm reset for each channel
- Built-in service function and self-test program
- Four alarm relays with 230 volts rated SPDT contacts
- Failsafe relay operation on power loss
- Audible alarm

Please Note!

MPU6 is normally supplied with default set alarm thresholds. These must be verified or reset during commissioning. Alarm levels must always be set on each channel for proper gas and detector type!

Default settings from factory:



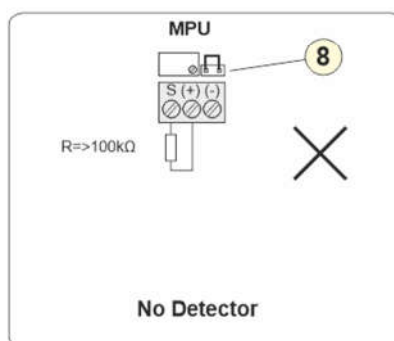
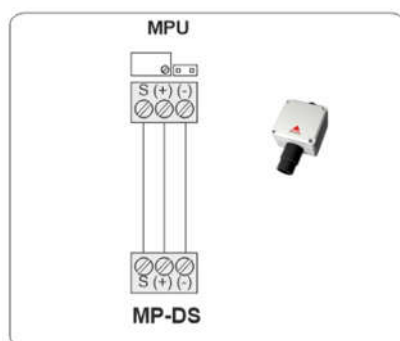
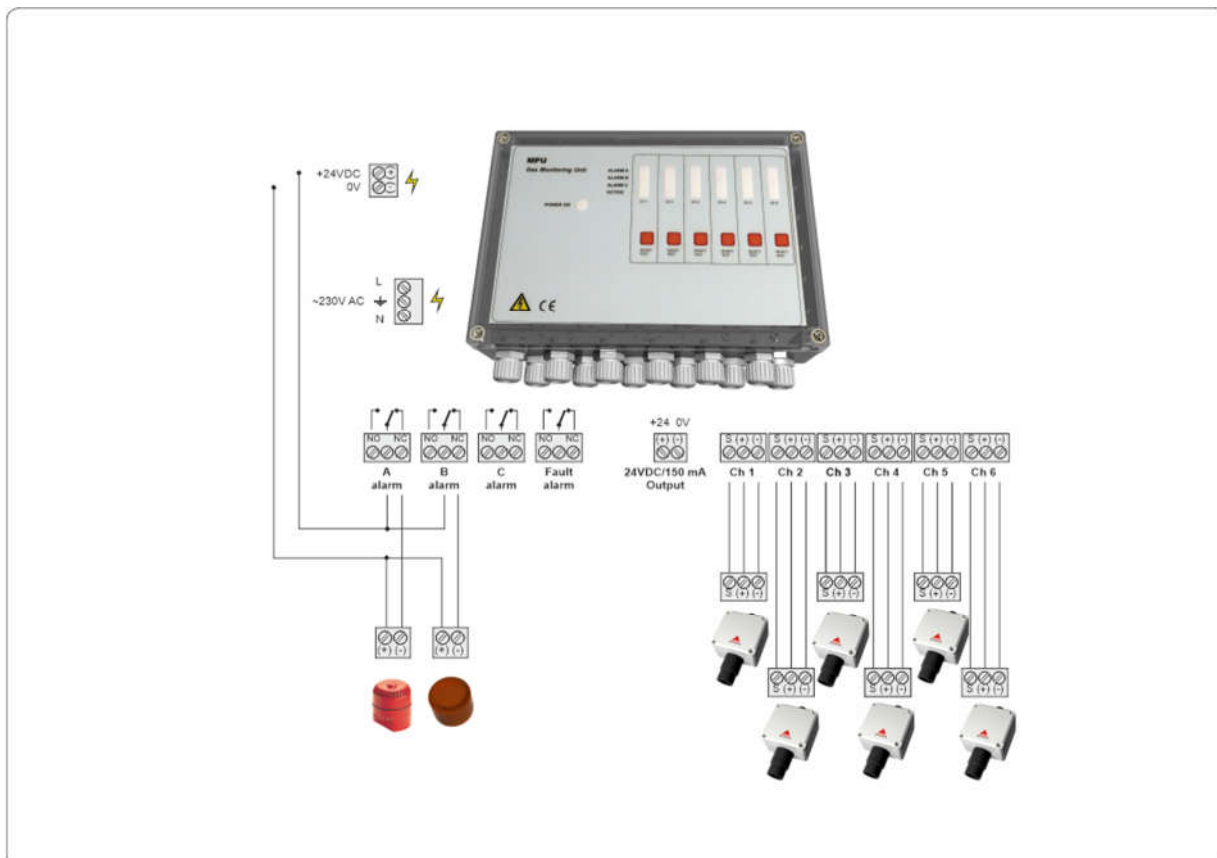
Alarm level	Offset
Alarm C	1,0V
Alarm B	2,0V
Alarm A	3,0V

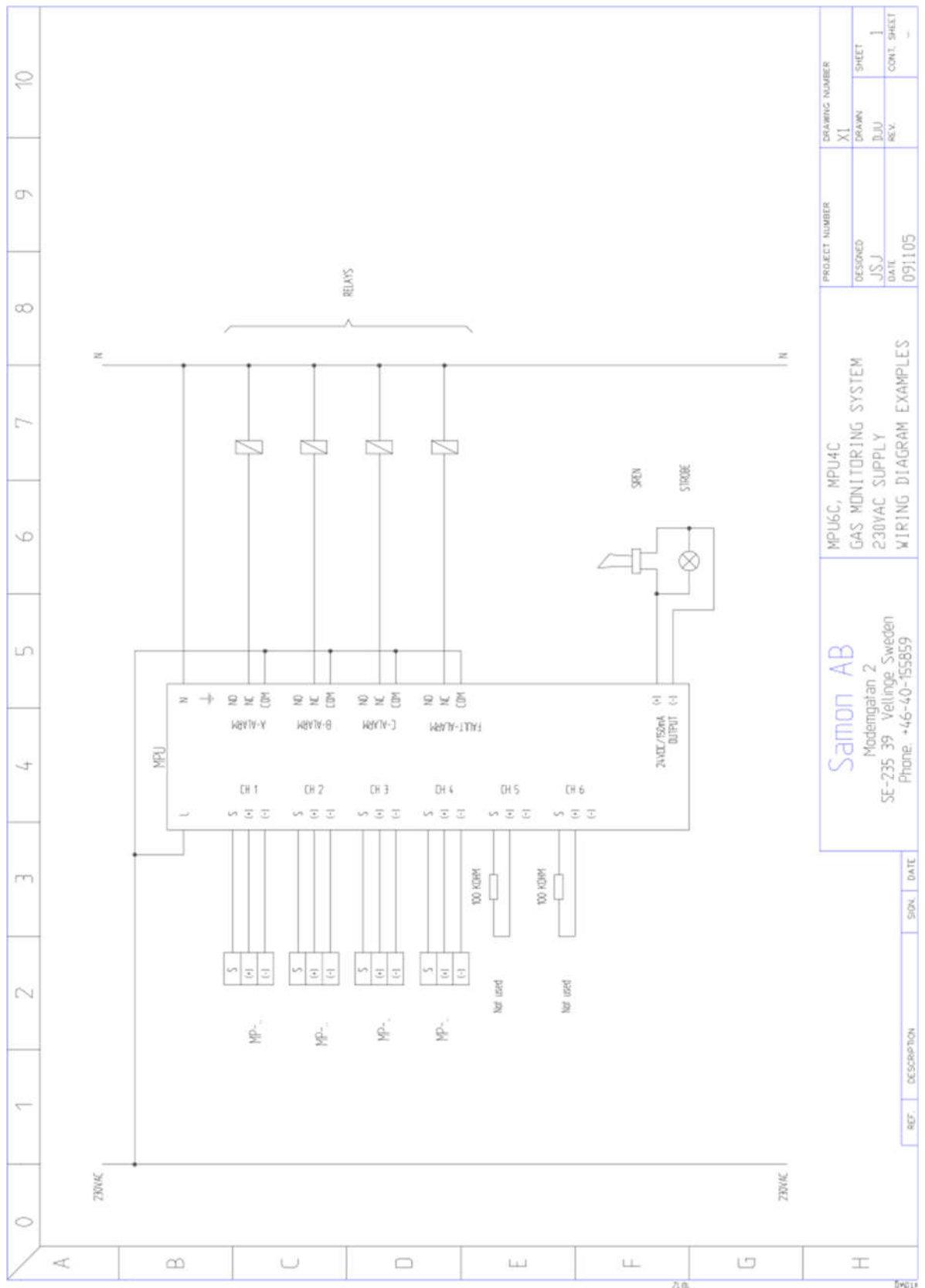
- Factory gas specific pre-calibration can be delivered upon request. Must be specified when ordering.

Alarm levels, factory settings are:

HFC, HFO, HCFC (ppm)	C=100	B=1000	A=2000
----------------------	-------	--------	--------

2. WIRING DIAGRAMS





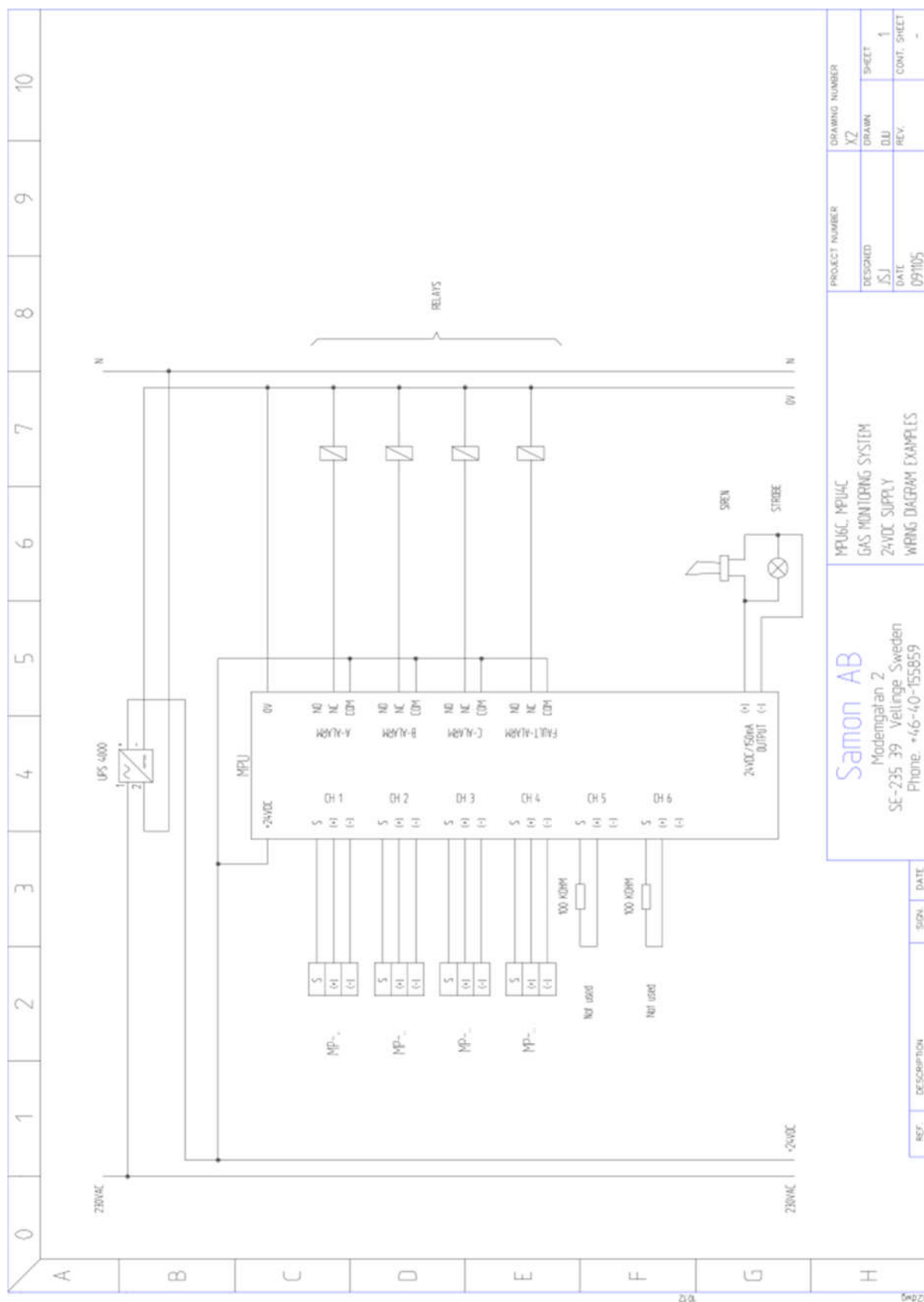


Fig. 2-4

Wiring diagrams

3. FUNCTION

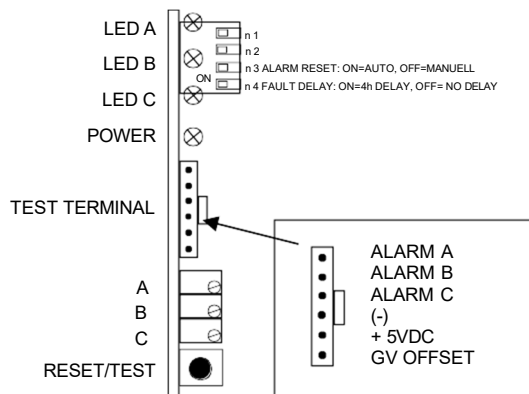


Fig. 5

Channel settings

After connecting each detector and applying power, the green LED on each channel will flash as the pre-heat process commences. After approximately 4 minutes the green LED will be illuminated permanently, and the sensor is fully operational. Each channel has one yellow and two red warning LEDs. The yellow LED indicates a low-level gas leak (above alarm threshold C) whilst the two red LEDs indicate gas concentrations above thresholds B and A.

When gas is detected above the respective alarm threshold the appropriate LED's will flash until the appropriate time delay has expired when it is permanently illuminated, and the corresponding relay contacts change state. As the gas concentration subsides the LEDs and relays will return to their normal state unless the 'manual reset' function has been selected. The audible alarm will be initiated if it is configured with the respective alarm threshold and cannot be muted. Technicians can however inhibit the alarm by selecting 'Service Mode'.

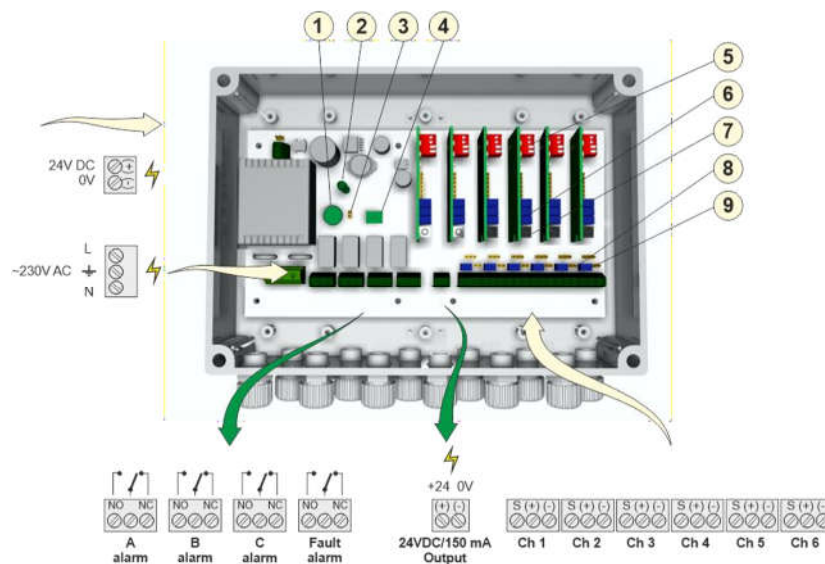


Fig. 6

Central unit details

4.1 AUTO/MANUAL ALARM RESET

DIP switch (5) no3 on each channel's control card manages the alarm reset function. "ON" enables Auto reset and "OFF" enables Manual reset, via depressing "Reset/Test/Service"-button (7).

4.2 ALARM TIME DELAY (T1)

DIP-switch (5) controls the alarm time delay for each channel.

no1	no2	
on	on	No alarm delay
off	on	1 minute delay
on	off	10 minutes delay
off	off	30 minutes delay

4.3 RESET/TEST/SERVICE-BUTTON (7)

Reset/Test/Service-functions is accessible via a pushbutton on the cover.

4.3.1 TEST MODE

By depressing the "Reset/Test/Service"-button (7) on any channel for 5 seconds the test program is initiated. This sequentially energizes each LED and relay at five second intervals. That the test program has started is indicated by the fact that all LEDs on chosen channel will go out.

4.3.2 SERVICE MODE

Depressing the "Reset/Test/Service" button (7) for 10 seconds will inhibit all alarm functions for the chosen channel for a period of 60 minutes. Service mode is indicated by the fact that all LEDs on the chosen channel are flashing. Whilst in this mode a new 60 minute inhibit period can be initiated by repeating the process. Normal operation will be automatically resumed after 60 minutes or can be cancelled by depressing the "Reset/Test/ Service"-button briefly.

4.3.3 FAULT MODE

In the event of a detector failure (GV offset < 0,1V) or disconnection of the interconnecting wiring a fault condition will be indicated by loss of the green 'Active' LED, the other LEDs start to flash and the alarm relay D is de-energized. In the event of power failure all relays (A, B, C & D) will be de-energized. Connections are available for an optional battery back-up to enable total continuity of operation in the event of a power failure. A 4-hour delay can be configured for relay D to prevent nuisance alarms. This is activated by setting DIP switch (5) no4 on the respective channel card to 'ON'. The operation of the LEDs will remain unchanged.

4.4 INTERNAL BUZZER AND 24VDC AUXILIARY OUTPUT

The internal buzzer (1) and 24VDC output can be activated by the DIP-switch (4) on the terminal board and can be user configured to operate from alarm concentration A(no1), B(no2) or C(no3). Setting the DIP-switch to ON for the respective alarm level, selects the appropriate alarm level. The 24VDC auxiliary alarm output is always activated together with the buzzer. However, by removing jumper Bb (3) the buzzer can be disabled.



Please Note!

After being powered off for prolonged periods the sensor may take several minutes to stabilize during which time 'false' alarms may be initiated. Such 'false' alarm shall disappear within a few minutes.

4.5 REMOTE DETECTORS

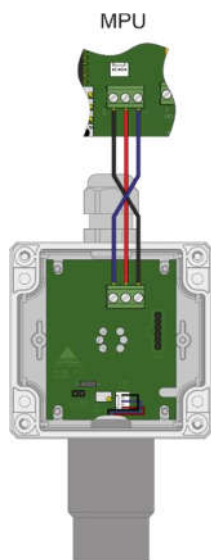


Fig. 7

Sensor connection

The "MP" is a range of detectors special designed for use with the MPU units.

Detectors are available for different gases, with different measuring ranges and in different housings to suit the actual application and environmental requirements. Examples of gases that are possible to detect are: HFC, HCFC and mixtures.

Other detectors can be connected to MPU unit. Contact us for further details.

Please Note!

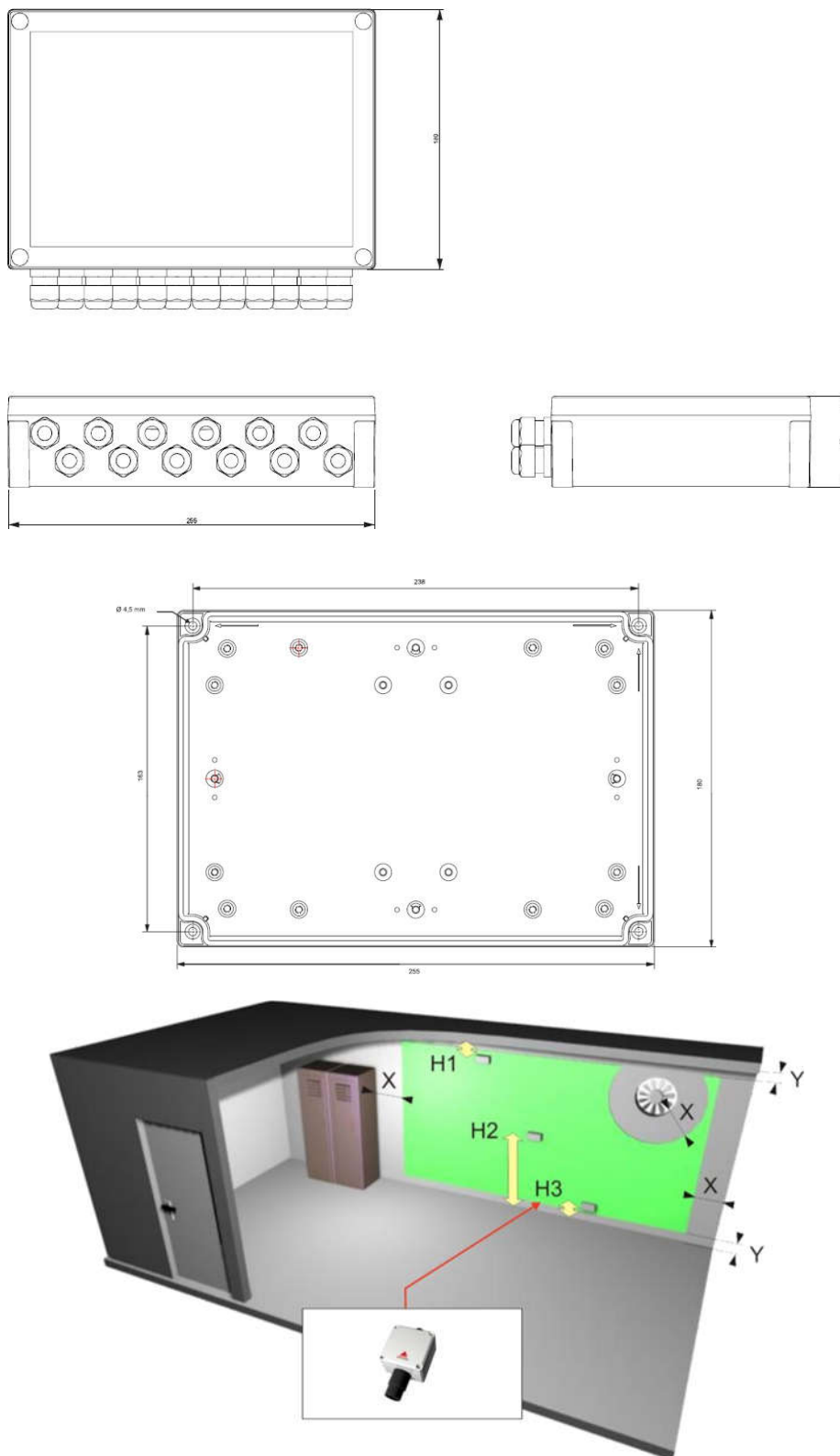
The sensors used in the MP-series have limited selectivity and are therefore not gas specific. Care should be taken when installing the equipment to minimize any cross contamination from other gases or vapours.

The cable length between sensor and central unit (MPU) is max 50m.

For further guidance on specific applications contact us.



5 LOCATION/INSTALLATION



HFC, HFO, HCFC

H3 = 20 cm

X = 50 cm

Y = 20 cm

Installation & Service guideline for HFC/HFO gas detectors in marine

Correct location of the detector is essential to ensure optimum operation of the system. Special consideration must be given to air movement and whether the gas to be detected is heavier or lighter than air. For gases heavier than air (e.g., Refrigerants (HFC, HCFC)) the sensor should ideally be located approximately 20cm above floor.

Connect the detector according to the wiring diagram.

NOTE! For unused channels a jumper (8) must be mounted and a $>100\text{ k}\Omega$ resistor (attached) must be installed between (+) and (S) to prevent open sensor alarms.

Otherwise, will the channel indicate a fault alarm.

When changing or replacing a detector a new calibration must be performed.

5.1 ALARM LEVELS / CHANGING ALARM LEVELS

The detector is supplied with default alarm thresholds (as stated on page 4). You can refer to the graphs in **APPENDIX 1** to identify the corresponding PPM levels for Alarm A, B and C based on the refrigerant type.

To set, verify or change the alarm thresholds, you need a service tool DT300 complete with sensor module and a screwdriver. Full details regarding custom alarm set-points for a range of gases together with a detailed procedure are outlined in specific data sheets. Multiple gases and alarm set-points can be accommodated on a single MPU as each channel is totally independent.

The diagnostic tool DT300 and the sensor module SM300-Self Sense **must be ordered separately.** They can be used for commissioning, calibration, and annual functional check (required by EN 378) without the need for calibration gas.

DT300 product number: 708037

SM300-Self Sense* product number: 708039

**The sensor module is consumable part which should be replaced annually.*

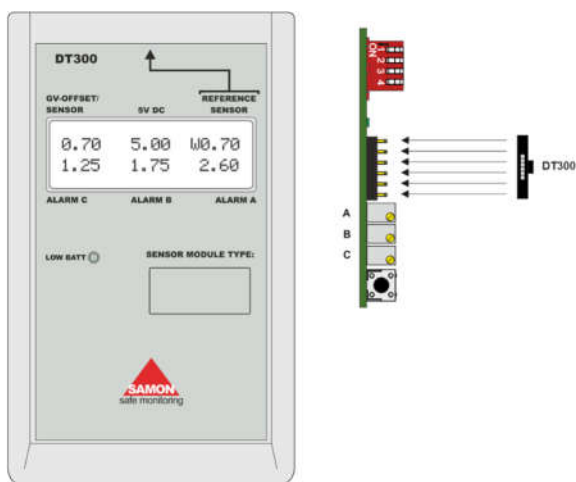
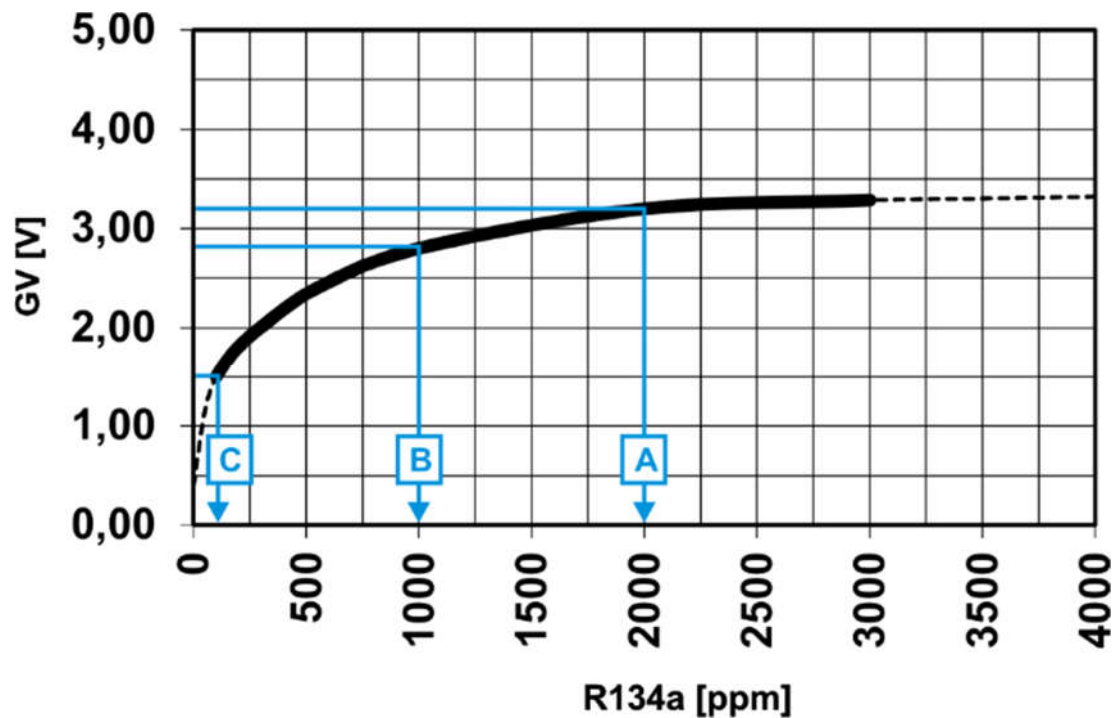


Fig. 8

Diagnostic tool DT300 equipped with SM300-SELF SENSE sensor.



			Alarm levels					
			C		B		A	
Refrigeration gas:	Sensor type	Nominal GV-offset [V]	[V]	[ppm]	[V]	[ppm]	[V]	[ppm]
R134a	SEN 027	0,4 V	1,5	100	2,8	1000	3,2	2000
R404a / R507C	SEN 027	0,4 V	1,5	100	3,3	1000	3,9	2000
R407f	SEN 027	0,4 V	1,5	100	3,7	1000	4,2	2000
R407C	SEN 027	0,4 V	1,7	100	3,1	1000	3,4	2000
R448A / R449A	SEN 027	0,4 V	1,7	100	3,7	1000	4,2	2000
R513A	SEN 027	0,4V	1,3	100	3,3	1000	3,8	2000
R417a	SEN 027	0,4 V	1,7	100	3,1	1000	3,4	2000
R410A	SEN 027	0,4 V	1,5	100	3,5	1000	3,9	2000
R22	SEN 027	0,4 V	1,0	100	3,1	1000	3,8	2000

5.2 FUNCTION CONTROL

Please Note!



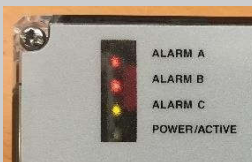
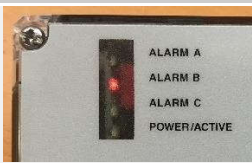
Testing the system is recommended to be done once a year. A basic function test can be made using a Service tool.

6 TROUBLESHOOTING

When we are troubleshooting, we recommend checking these following steps:

- Reset alarm on the test / reset-button if possible.
- Check sensor value and calibrate if necessary / possible.
- Check for possible leak.
- Age of sensor
- Last calibration date of sensor
- Possible contaminations from oil, cleaning aids, silicone, hydrogen, glue, paint

Below is an LED indication guide explaining the different indication options.

LED indication	Interpretation	Solution
	All four LEDs are lit = A-alarm Green + Yellow + Red + Red	The highest alarm level is activated.
	Bottom three LEDs are lit = B-alarm Green + Yellow + Red	Middle alarm is activated -Go by the checklist.
	Bottom two LEDs are lit = C-alarm Green + Yellow	Lowest alarm level is activated -Go by the checklist.
	Top three LEDs flashing = Fault alarm	Possible sensor fault Check sensor connections Change the sensor if calibration isn't possible.
	Only one red LED are lit = Fault alarm longer than 4h.	See instructions for" Fault alarm"
	All four LEDs are flashing = Service Mode All three relays are frozen for 60min, and no alarms will be triggered.	Alarm blockage activated for 1h. Relays will not change position when alarm levels are triggered. Normal mode can be activated by pressing the reset/test button once.

7 CLAIM/WARRANTY PROCEDURE

Before contacting SAMON for a claim, be sure to have read this guideline and most importantly tested the sensor in the correct way. As our experience is that 99% of all claims in the end is sensor related. A poisoned sensor is not granted by warranty.

SAMON offers 5 years of warranty on our products (excluding the sensor head).

If you have a problem with the product (that is not caused by the sensor) you must contact SAMON and we will activate an RMA (Return Merchandise Authorization).

When activating an RMA, SAMON will send out an RMA form that must be filled in in full and be sent together with the product.

Please Note!

Products that are sent to SAMON without being registered as an RMA will not be handled as an RMA. SAMON earns the right to refuse products that are sent without an RMA registration.



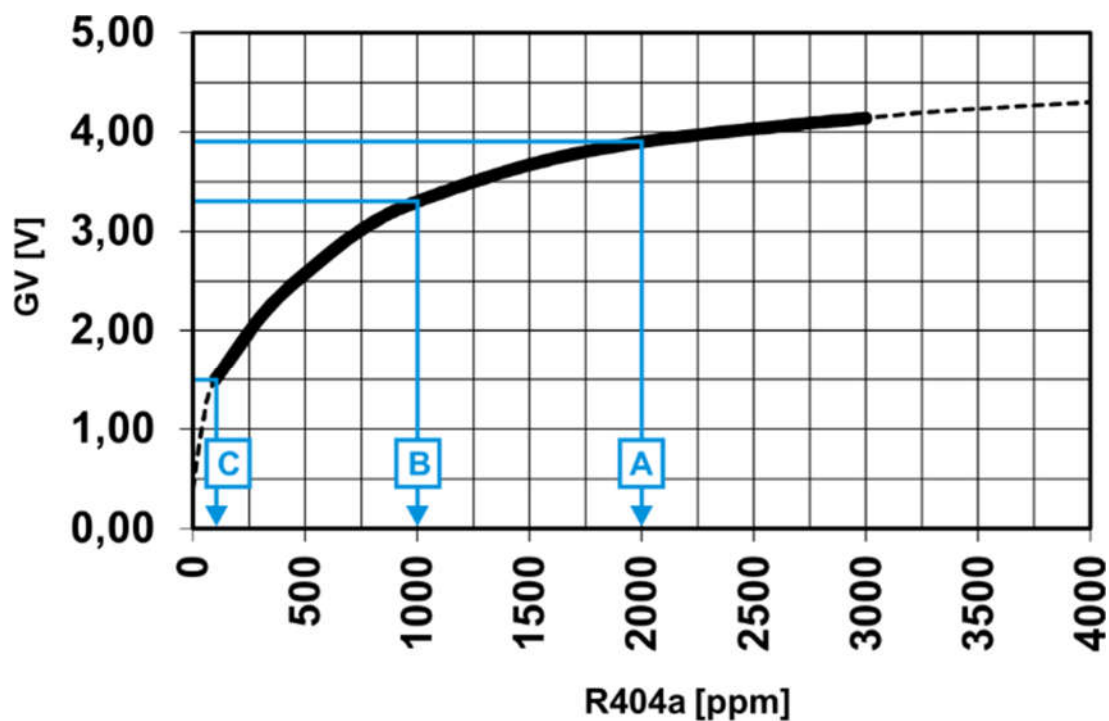
A product that is sent to SAMON's workshop for claim, registered as an RMA will be checked and tested as soon as possible as SAMON's intentions are to minimize the standstill as much as possible for the end user.

Contact info for RMA:

RMA@samon.se

8 APPENDIX 1

Gas	R404a / R507a
Range	0 – 4000 ppm



Gas	R407f
Range	0 – 4000 ppm

