Guardian Controls International Ltd
refrigeration controls, energy optimisation & LED lighting

GUARDIAN MT0590

CO_2 Gas Detector

This CO_2 Gas Detector measures room CO_2 levels every second generating CO_2 concentration values in ppm.

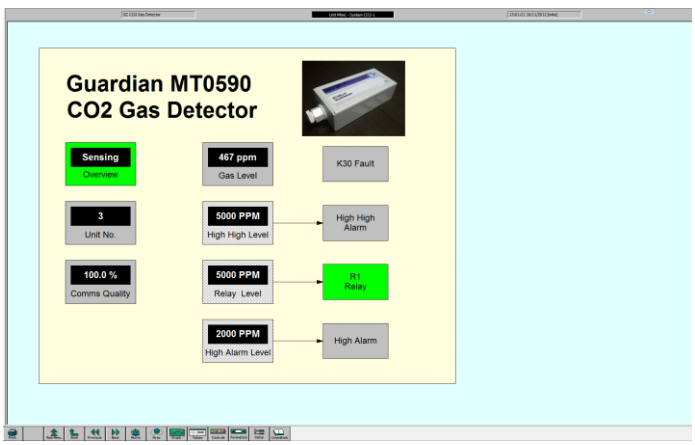
The detector transmits the latest CO_2 level value and alarm status using RS485 Modbus RTU communications whenever requested by a remote BMS /SCADA system.

The detector also provides one on/off volt free changeover alarm relay contact (3A) to control a local audible alarm, flashing beacon or a ventilator when the measured level value exceeds a preset relay activation level.

The alarm relay can be selected to lockout after an alarm which then requires a remote reset command via the RS485 communications highway to clear the alarm relay contacts back to normal. The alarm can be set to automatically clear when the level is below the relay de-activation gas level setting.

Two further alarm level settings and states may be setup for remote alarm level indication and messages using RS485 Modbus communications. These alarms are automatically reset when the gas level goes below the appropriate alarm clear setting.

- CO_2 level (ppm) measurement
- Uses Non-Dispersive Infra Red technology
- 1 Relay operate level setting
- 2 Alarm / warning level settings,
- Volt free C/O relay contact for ventilation fans , alarm beacon or audible alarm.
- Relay Lockout selection with remote reset
- RS485 Modbus RTU communications
- Programmable setpoints and timers
- Address selection by internal LED lamp and button.
- Wall mounted by 4 screws (supplied)
- 24vdc 2VA supply required



Status Display screen

SPECIFICATION	
Target Gas	Carbon Dioxide
Operating Principle	Non-dispersive infrared (NDIR)
Measurement range	0 to 5000ppm
Accuracy	±30ppm, ± 3% of reading
Response Time	20 sec diffusion time
Rate of Measurement	0.5 Hz
Operating Temperature	-20°C to +50°C
Operating Humidity	0 to 95%RH
Storage temperature	-30°C to +70°C
Housing	ABS fireproof IP24
Wall Mounting	secured by 4 screws (supplied)
Dimensions (mm)	L:130mm W:62mm H:40mm
Power supply	24vdc 2VA
Warm up time	1 minute
Response time	<2 minutes for 90% step change
Stability	<2% FSD
Life expectancy	>15 years typical
Maintenance	Maintenance-free with built in ABC logic for self calibration of sensor
Compliance with	RoHS directive 2002/95/EG Tested accordingly Immunity EN61000-6-3 2007 Emmission EN61000-6-2 2007
Serial Communications	RS485 Modbus RTU at 19200baud
Changeover Relay	0-230vAC 3A Max
Relay	De-energised for alarm Auto or Manual reset selection
Standard	CE Approval

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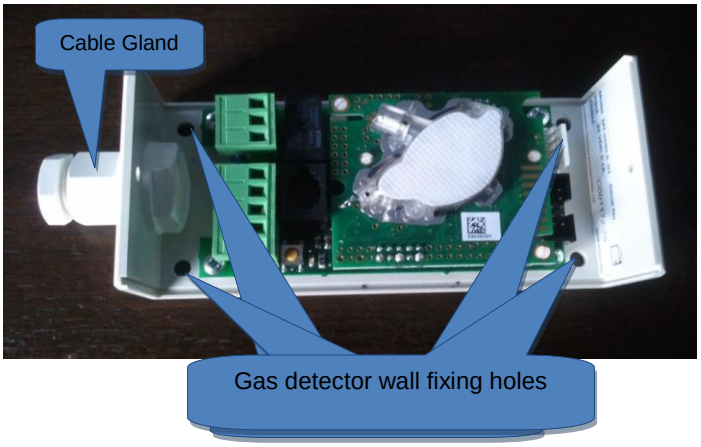
INSTALLATION

Do not mount this unit :-

- ***In a corner***
- ***Behind a Door***
- ***Near garbage bins***
- ***Near gas ovens***
- ***In direct sunlight***
- ***Near a heat source or steam pipe***



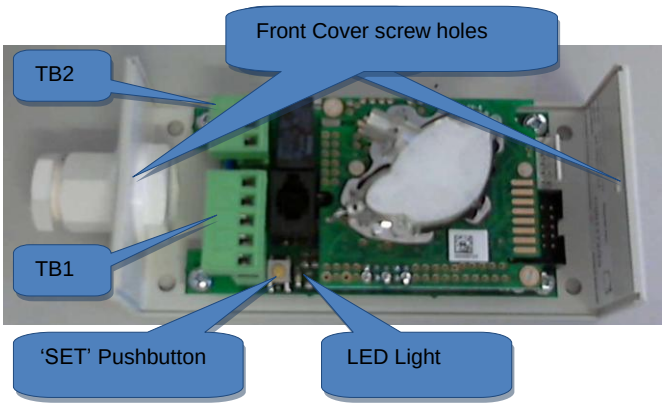
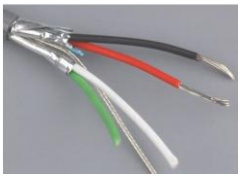
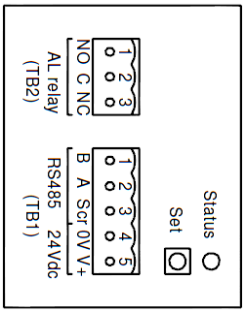


FIG 1 Detector base with PCB

- *Remove two cover screws (if fitted) and slide off Front cover*
- *Mark and drill 4 wall fixing holes*
- *Insert wall plugs and screw gas detector base to wall with the 4 screws (supplied).*
- *Insert 2 twisted pair screened communications cable through cable gland and connect cable screen, RS485 and 24vdc power wires to TB1. (BELDON 8723)*
- *Insert 2-core Alarm relay cable through cable gland and connect wires to TB2.*
- *Tighten cable gland and plug in TB1 and TB2 connectors.*
- *Setup Modbus Address using 'Set' button and status LED light as below.*
- *Slide cover back onto the base and secure with the 2 screws provided.*



Belden 8723 cable



Terminal layout label on underside of cover

Setup Modbus Address for MT0590

For correct operation, **MT0590** detectors need to be setup with a unique Modbus Address on the RS485 highway.
This done using the **'SET'** pushbutton and status **LED** on the PCB inside the detector .(See FIG 1 opposite.)
To access the PCB, unscrew the front cover holding screws and then slide the cover off the base.

Address Check Procedure

For each detector:-
Depress and hold the **'SET'** pushbutton until the green status LED light goes off.
Release the pushbutton.
The status LED waits and then flashes the current address eg 3 pulses for Modbus address 3, waits again and then goes steady.

Address Change Procedure

Depress and hold the **'SET'** pushbutton until the green status LED light goes off.
Release the pushbutton.
Before the lamp comes on to flash the current address, quickly depress the pushbutton the number of times for the new address e.g. press twice for address 2.
The status LED lamp then waits, flashes the new address, waits and then goes steady.

The new address selection can be checked as Address Check procedure above.

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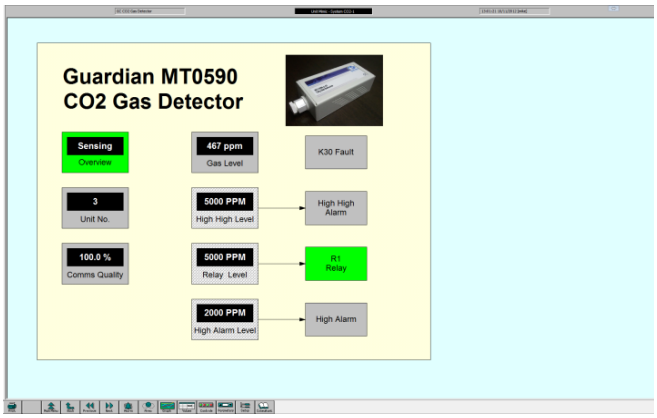
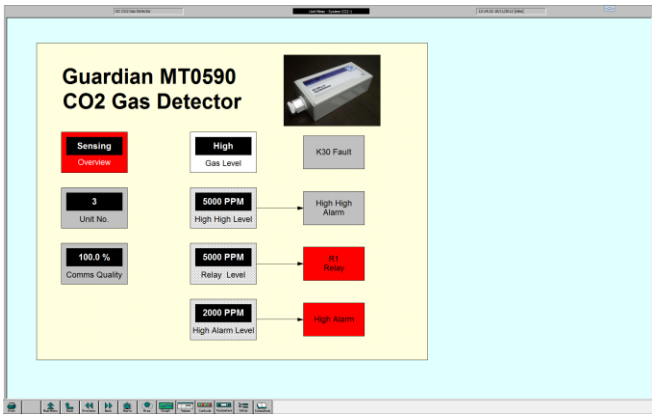
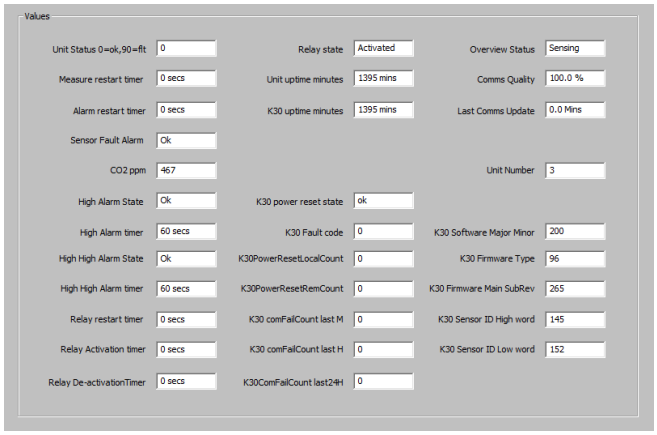
MT0590 *CO_2 Gas Detector* Display Screens on '*Consultant*' PC



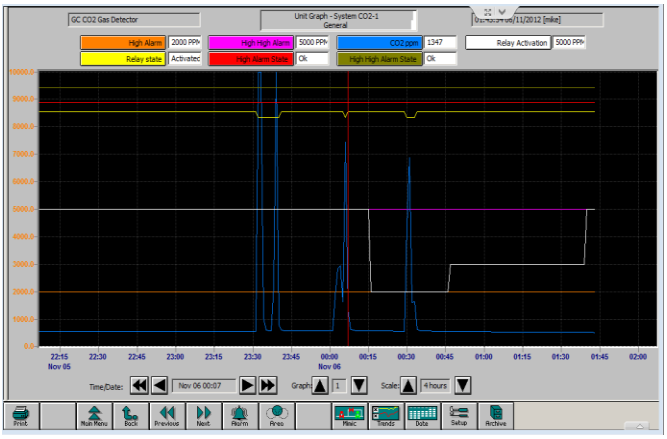
Controls Display screen



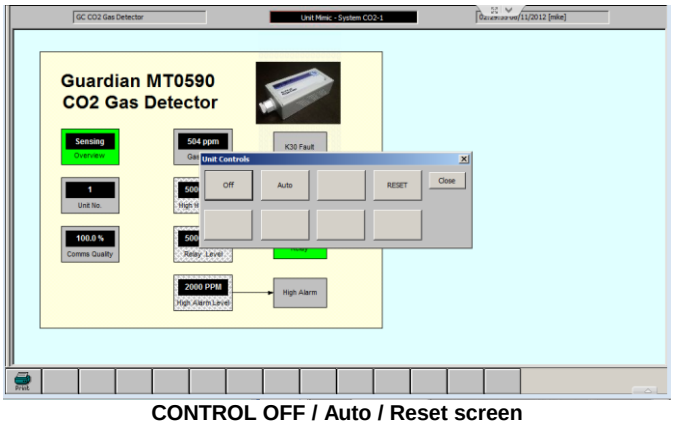
Alarm Status Display screen



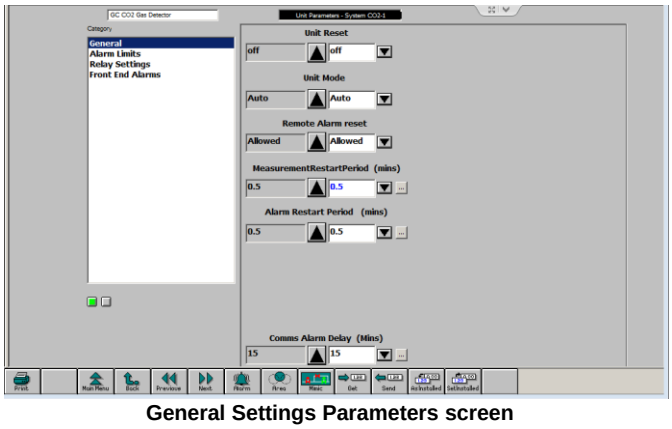
Values Display screen



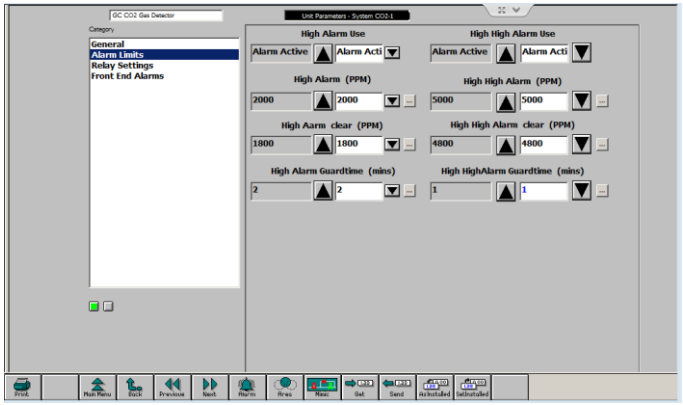
Graph Display screen



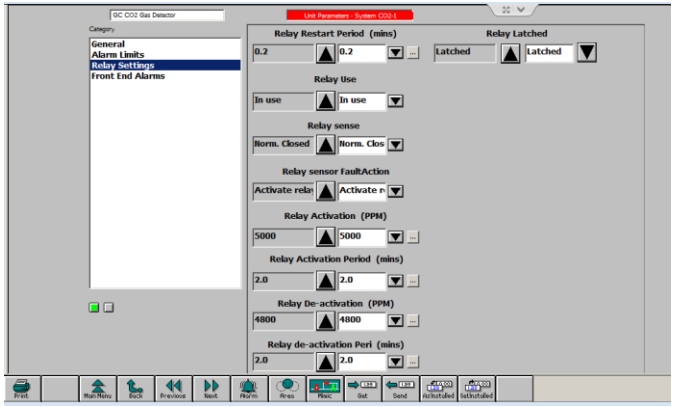
CONTROL OFF / Auto / Reset screen



General Settings Parameters screen



Alarm Limits Parameters screen



Relay Settings Parameters screen

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MODBUS INPUT OUTPUT POINTS LIST

MT0590 CO2 Gas Detector

HOLDING		Read/Write parameters	default	units	Function
Modbus	Gcomms	GC Interface			
1000	12001	Unit Reset:			set to 1 to reset all alarm conditions and timers.
1001	12002	Unit Mode 1:	1		Off = 0, Auto = 1
1002	12003	Remote Alarm reset	1		0 = not allowed, 1= allowed)
1003	12004	Measurement Restart Period	0.2	mins	(After power on give sensor time to settle if required.
					Not Available 'N/A returned on comms until elapsed, no alarm or relay action)
1004	12005	Alarm Restart Period	0.5	mins	(after power up no alarm until this has elapsed)
1005	12006	High Alarm Use	1		(0 = not in use, 1= Alarm active)
1006	12007	High alarm Level	2000	ppm	(when ppm has been above this limit for longer than guardtime alarm status is set)
1007	12008	High alarm clear	1800	ppm	(when ppm drops below this level alarm status clears
1008	12009	High Alarm Guardtime	2	mins	(time to elapse with ppm above limit before alarm state is set)
1009	12010	High High Alarm Use	1		(0 = not in use, 1= Alarm active)
1010	12011	High High alarm Level	5000	ppm	(when ppm has been above this limit for longer than guardtime alarm status is set)
1011	12012	High High alarm clear	4800	ppm	(when ppm drops below this level alarm status clears
1012	12013	High High Alarm Guardtime	2	mins	(time to elapse with ppm above limit before alarm state is set)
1013	12014	Relay Restart Period	0	mins	(after power up no relay action until this has elapsed)
1014	12015	Relay Use	1		(0 = not in use, 1= in use)
1015	12016	Relay sense	1		(0 = normally open, 1= normally closed)
1016	12017	Relay sensor fault action	1		(0 = do nothing, 1= activate relay)
1017	12018	Relay Activation Level	5000	ppm	(Relay is activated when ppm has been above this limit for longer than the activation period)
1018	12019	Relay Activation Period	2	mins	(when ppm has been above activation limit for this period relay is activated)
1019	12020	Relay De-activation Level	4800	ppm	(Relay is de-activated when ppm has been below this limit for longer than the de-activation period)
1020	12021	Relay de-activation Period	0	mins	(when ppm has been below de-activation limit for this period relay is de-activated)
1021	12022	Relay Latched	0		(0 = not latched, 1= latched and requires remote reset to de-activate relay)

INPUT		Read only Values			
Modbus	Gcomms				
Following points added so alarms on Consultant work ok.					
	313	last comms update timer			
	390	last comms update alarm			
	545	Sensor PPM			
	552	Sensor High Alarm			
	553	Sensor High High Alarm			
	605	Comms alarm delay		mins	
	1146	Communications Quality		%	
	1329	Data Point mapping alarm			
	1562	Unit address			
	5651	K30 fault			
1000	10001	Unit Status			0 = ok, 90 = Fault
1001	10002	Measure restart timer		secs	
1002	10003	Alarm restart timer		secs	
1003	10004	Sensor Fault Alarm			(0 =ok, 1= fault)
1004	10005	CO2 ppm		ppm	
1005	10006	High Alarm State			(0 = ok, 1= Alarm)
1006	10007	High Alarm timer		secs.	
1007	10008	High High Alarm State			(0 = ok, 1= Alarm)
1008	10009	High High Alarm timer		secs.	
1009	10010	Relay restart timer		secs	
1010	10011	Relay Activation timer		secs	
1011	10012	Relay De-activation timer		secs	
1012	10013	Relay state			(0 = de-activated, 1= activated)
1013	10014	Unit uptime minutes		mins	
1014	10015	K30 uptime minutes		mins	
1015	10016	K30 power reset state			(inititiated via Modbus 0 = ok, 1= powered off, 2 = waiting, 3 = power on)
1016	10017	K30 Fault code			(first 7 bits report faults so can have multiple faults?)
1017	10018	K30 Power reset Local count			
1018	10019	K30 Power reset Remote count			
1019	10020	K30 comms fail count last minute			
1020	10021	K30 comms fail count last hour			
1021	10022	K30 comms fail count last 24 hours			
1022	10023	K30 Software Major Minor revision			(eg 200 = v2.00)
1023	10024	K30 Firmware Type			
1024	10025	K30 Firmware Main Sub Revsion			
1025	10026	K30 Sensor ID High word			
1026	10027	K30 Sensor ID Low word			

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