

Installation and Operating Instructions GEN-XFER & GEN-XFER ND



Crompton GEN-XFER Installation & Operating Instructions

Important safety information is contained in this manual. Users must familiarise themselves with this information before attempting installation or other procedures.

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1. Introduction

The GEN-XFER provides for automatic transfer of a load from mains to generator in the event of a mains supply failure. Intended for unattended operation, it is able to detect failure of any phase of the mains and to start and switch over to a generator if the mains voltage goes outside pre-set limits. Both automatic and manual control is possible. A test mode is also available which allows the generator to be run without taking the load.

The unit monitors generator operation and gives warning of any faults that are detected, by LED indicators. The unit monitors:

- Mains supply voltage
- Alternator voltage and frequency
- Engine temperature
- Oil Pressure
- Charge generator voltage
- Engine speed

It controls:

- Engine fuel supply or engine stopping
- Starter motor
- Alarm horn
- Automatic generator start and load transfer on mains failure
- Mains and Generator contactors

GEN-XFER features a four-digit, seven-segment LED display, providing extensive monitoring of unit and generator parameters, including:

- Three phase mains voltage
- Alternator output Voltage and frequency
- Engine RPM
- Battery voltage
- Elapsed time
- Error indication
- Program parameters

GEN-XFER ND has no display, offers identical functionality and programming via RS232, and can be used where electrical and engine metering is already in place.

The unit is extensively programmable through the front panel, with password protection on two levels. Operational parameters can also be monitored and controlled from a PC via a built-in RS232 port.

If the engine fails to start on the first attempt, further attempts are made up to a programmed number of times or until successful.

If a fault is detected, the unit shuts down the engine and indicates the failure by flashing a relevant fault LED.

Emergency stop and remote inhibit inputs provide for remote control of the engine. Configurable inputs can be programmed to perform many functions, such as warning alarms, stopping the engine or disconnecting the load.

A configurable output can be programmed for various functions, including alarms, operation as a pre-heat output, indication of engine running status, and indication that the product is in Automatic mode.

2. Installation



Before commencing installation:

- Disconnect all electrical power to the machine.
- Make sure the machine cannot operate during installation.
- Follow all of the machine manufacturers' safety warnings.
- Read and follow all installation instructions.

2.1 Unpacking

Carefully unpack the unit and check for damage to the unit or to the cables supplied. Retain the packing in case of future need, e.g. returning the unit for calibration.

Check the contents, as follows:

- One GEN-XFER unit.
- Operating Manual.
- Screw clamp electrical connectors.
- Panel mounting kit.
- RS232 Cable.

Report any shortage or damage to your local sales office as soon as possible.

2.2 Unit Configuration

The unit can be programmed using the buttons and display on the front panel. Refer to Section 3 Programming for details. Alternatively, the unit can be programmed via the RS232 communication port, using PC based software.

2.3 Mechanical Installation

The unit is designed for panel mounting. Fixing is by four screw fixings. (See Figure 2.1)

1. Insert the unit in the panel cut-out from the front.
2. Insert the fixings through the mounting holes and tighten the fixing screws to secure the unit against the panel.



During mechanical installation, beware of any sharp burrs on the metal panel aperture. Ensure that the fixings are properly tightened to prevent the fixings becoming loose due to panel vibration.

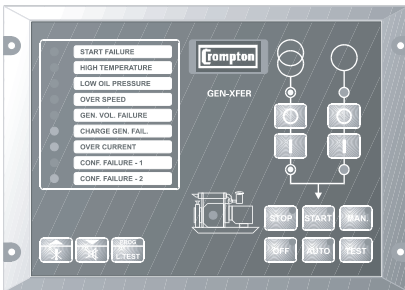


Figure 2.1 Front view

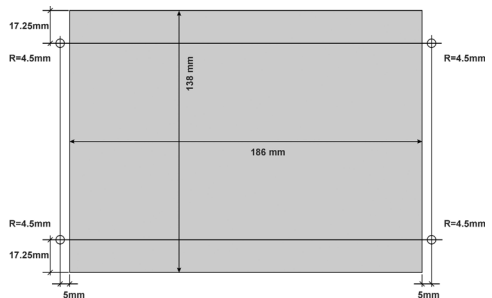
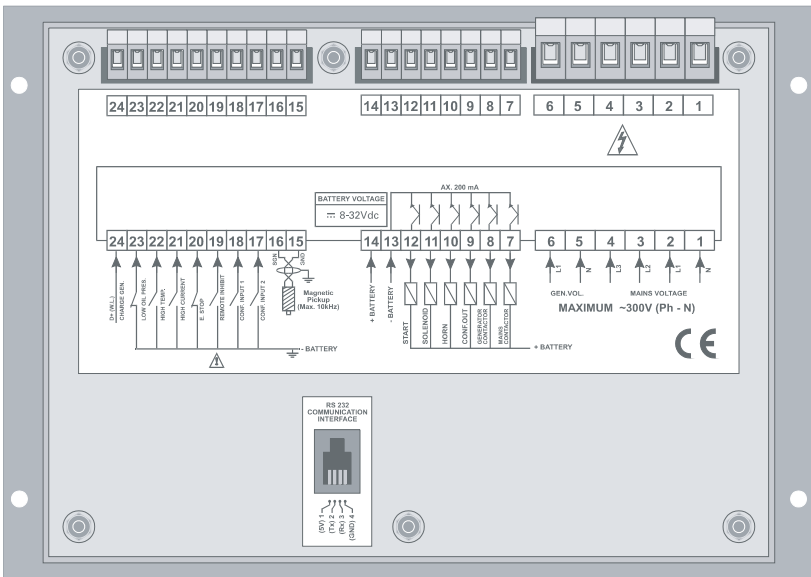


Figure 2.2 Panel cut-out



Figure 2.3 Side view

2.4 Electrical Connections



Only qualified personnel and trained technicians should work on this equipment. This equipment contains dangerous voltages. Do not open or dismantle the product enclosure.



The Remote Inhibit input is only active when the unit is in the AUTO Mode. When asserted, the engine will not start up. If the engine was already running when this input is asserted, the engine will shut down. The generator operates normally when the input is open circuit.

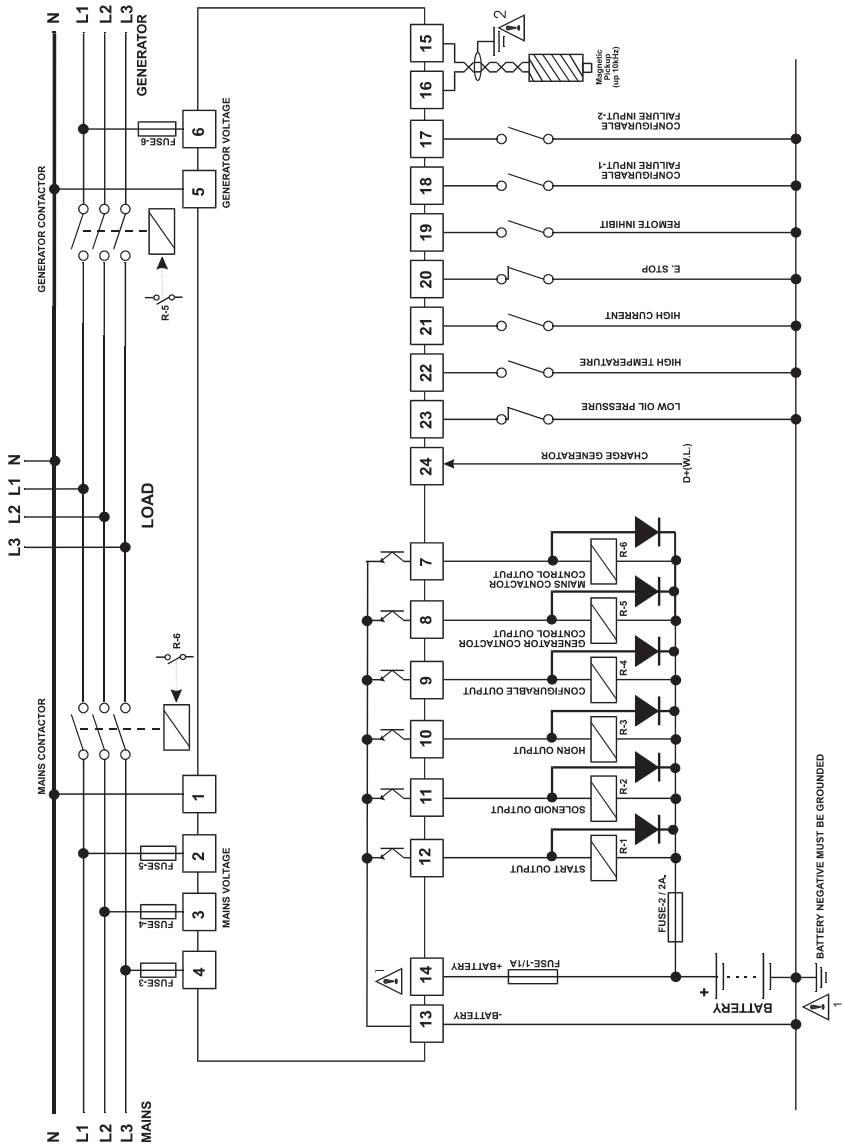


Figure 2.5 GEN-XFER three phase connections schematic



Ensure the battery supply is of the correct polarity, and that the battery negative rail is grounded. The connectors can be unplugged from the rear of the unit for convenience and to speed up installation.



The fuses should be as follows:

FUSE 1 1 Amp.

FUSE 2 2 Amp.

FUSE 3 .. 6 1 Amp.



Use screened cable for Magnetic Pickup connections, ensuring that the screen is grounded at one end **ONLY**.

Table 2.1 shows the connections and recommended cable sizes. Table 2.2 describes the functions of the connections.

Table 2.1 Unit wiring

Pin	Description	Cable Size (mm)	Notes
1	Mains PEN conductor	2.5	
2	Mains voltage input (L1)	2.5	
3	Mains voltage input (L2)	2.5	3 phase applications only
4	Mains voltage input (L3)	2.5	3 phase applications only
5	Alternator PEN conductor	2.5	
6	Alternator voltage input (L1)	2.5	
7	Output to mains contactor (via external relay) transistor output.	1	500 mA
8	Output to generator contactor (via external relay) transistor output.	1	500 mA
9	Configurable output (via external relay) transistor output.	1	500 mA
10	Output to horn (via external relay) transistor output.	1	500 mA
11	Output to fuel / stop solenoid (via external relay) transistor output.	1	500 mA
12	Output to start (via external relay) transistor output.	1	500 mA
13	- Battery supply to GEN-XFER and transistor outputs common.	2.5	Supplies to unit.
14	+ Battery supply to GEN-XFER	2.5	Supplies to unit
15	Input from magnetic pick-up	1	
16			
17	Configurable failure input-2	1	Switch to "0" volt.
18	Configurable failure input-1	1	Switch to "0" volt.
19	Input from remote inhibit	1	Switch to "0" volt.
20	Input from emergency stop	1	NC to "0" volt. Open circuit for emergency stop.
21	Input from high current	1	Switch to "0" volt.
22	Input from high temperature	1	Switch to "0" volt.
23	Input form low oil pressure	1	Switch to "0" volt.
24	Input from charge generator	1	

Table 2.2 Unit wiring description

Pin	Function	
1	Mains PEN conductor to GEN-XFER	
2	Mains voltage inputs. Used to detect failure for controlling automatic transfer of load to alternator. Pins 3 and 4 not used on single phase applications.	
3		L1
4		L2 L3
5	Alternator PEN conductor to GEN-XFER	
6	Input from alternator L1 phase. Unit can be programmed to use frequency of alternator output to detect when engine has started.	
7	Output for mains contactor relay. Transistor output. Normally Closed or Normally Open operation for mains contactor can be selected.	
8	Output for alternator contactor relay. Transistor output.	
9	Configurable failure output. Can be programmed to provide transistor output closure when: alarm occurs, engine is running, unit is ready for automatic operation or preheat function. (via external relay)	
10	Transistor output to horn. Max 500 mA. Alarm output. (via external relay)	
11	Transistor output to fuel / stop relay. Max 500 mA. Controls fuel to engine or controls engine stopping. (via external relay)	
12	Transistor output to start relay. Controls starter motor. (via external relay)	
13	- Battery input supplies GEN-XFER	
14	+ Battery input supplies GEN-XFER	
15	Input from magnetic pick-up. Unit can be programmed for number of teeth detected on flywheel.	
16		
17	Configurable failure input-2. Normally open. When switched to 0V, can be programmed to sound the horn, flash the annunciator lamp, stop the engine or de-energise the generator contactor control transistor output.	
18	Configurable failure input-1. Normally open. When switched to 0V, can be programmed to sound the horn, flash the annunciator lamp, stop the engine or de-energise the generator contactor control transistor output.	
19	Input from remote inhibit switch. Normally open contact. Active when the unit is in the AUTO mode. The engine will not start, when contact is closed, if asserted while the engine is running, engine will shut down. Generator keeps on running normally when the contact is opened.	
20	Emergency stop input. Normally closed. When switch is opened, engine will stop.	
21	Over current input. Normally open contact. Closed on over current. On over current, unit de-energise generator to remove load. Engine is not shut down.	
22	Input from temperature switch. Switched to 0V.	
23	Input from low oil switch.	
24	Input from charge generator. Can be used to detect when engine has started. Must be left unconnected if not used.	

3. Programming

3.1 Procedure

The unit is extensively programmable through the front panel and via PC software.

Table 4 Programmable function definitions

Prg. No.	Definition of Parameter	Unit	Lower / Upper Limit	Default	
P00	Mains voltage connection level	VAC	60 – 600	320	
P01	Mains voltage disconnection level	VAC	60 – 600	300	
P02	Mains voltage upper limit	VAC	60 – 600	440	
P03	Alternator voltage lower limit	VAC	60 – 600	320	
P04	Alternator voltage upper limit	VAC	60 – 600	440	
P05	Speed upper limit	Hz.	30.0 – 75.0	53.0	
P06	Periodic maintenance day set value	Day	90 – 365	365	
P07	Periodic maintenance hour set value	Hour	0000 – 9999	5000	
P08	Periodic maintenance hour reset	Press 'Silence Alarm' Button to reset			
P09	Number of starting attempts	Number	1 – 10	3	
P10	Engine cooling time	Minute	0 – 99 0 = disables cooling process	3	
P11	Horn duration	Second	0 - 999 0 = continuous	60	
P12	Mains transition delay	Minute	0 - 30	3	
P13	Preheat time	Second	0 - 99	10	
P14	Exercise time	Hour	0 - 999 0 = disable	0	
P15	Exercise duration time period	Minute	0 – 999	20	
P16	Single / Three phase selection		1 / 3	3	
P17	Speed sensing input selection		0 = Alternator signal (internal) 1 = Magnetic pick-up	0	
P18	Nominal alternator frequency	Hz.	50.0 / 60.0	50.0	
P19	Nominal speed	Rpm	500 – 5000	3000	
P20	Tooth number	Number	1 – 1000	100	
P21	Battery voltage lower limit	VDC	7.2 – 24.0	8.0	
P22	Mains change over delay	Second	0.1 – 25.0	1.0	
P23	Stop / Fuel solenoid selection		Stp / Fuel	Fuel	
P24	Stop magnet energising time	Second	0 – 99	20	
P25	Engine started signal				
	P25.0	Charge generator	0 = NO 1 = YES	0 / 1	1
	P25.1	Speed		0 / 1	0
	P25.2	Alternator voltage		0 / 1	1
	P25.3	Oil pressure		0 / 1	0

Prg. No.	Definition of Parameter	Unit	Lower / Upper Limit	Default
P26	Starting attempt duration	Second	5 – 99	5
P27	Alternator voltage limit for crank disconnection	VAC	40 – 360	300
P28	Speed limit for crank disconnection	Hz.	20.0 – 45.0	40.0
P29	Oil pressure by-pass time	Second	0 – 99	30
P30	Control on delay	Second	0 – 99	10
P31	Alternator voltage fault control delay	Second	0.0 – 10.0	5.0
P32	Speed fault control delay	Second	0.0 – 10.0	5.0
P33	Engine running time reset	Enter technician password to reset time to "0" (zero)		
P34	"Power ON" default mode configuration	Number	0=OFF, 1=AUTO	0

Prg. No.	Definition of Parameter	Unit	Lower / Upper Limit	Default	
	Normal / Fail safe configuration of inputs:	Number			
P35	All normal	0			
	Temperature Fail-safe	1			
	Pressure Fail-safe	2			
	Temp. + Pressure Fail-safe	3			
	Spare1 Fail-safe	4			
	Spare1 + Temp. Fail-safe	5			
	Spare1 + Pressure Fail-safe	6			
	Spare1 + Temp + Pressure Fail-safe	7			
	Spare2 Fail-safe	8			
	Spare2 + Temp. Fail-safe	9			
	Spare2 + Pressure Fail-safe	10			
	Spare2 + Temp + Pressure Fail-safe	11			
	Spare1 + Spare2 Fail-safe	12			
	Spare1 + Spare2 + Temp. Fail-safe	13			
	Spare1 + Spare2 + Pressure Fail-safe	14			
	Spare1 + Spare2 + Pressure + Temp. Fail-safe	15			
	Current Fail-safe	16			
	Current + Temp. Fail-safe	17		0-31	0
	Current + Pressure Fail-safe	18			
	Current + Pressure + Temp. Fail-safe	19			
	Current + Spare1 Fail-safe	20			
	Current + Spare1 + Temp. Fail-safe	21			
	Current + Spare1 + Pressure Fail-safe	22			
	Current + Spare1 + Pressure + Temp. Fail-safe	23			
	Current + Spare2 Fail-safe	24			
	Current + Spare2 + Temp. Fail-safe	25			
	Current + Spare2 + Pressure Fail-safe	26			
	Current + Spare2 + Pressure + Temp. Fail-safe	27			
	Current + Spare2 + Spare1 Fail-safe	28			
	Current + Spare2 + Spare1 + Temp. Fail-safe	29			
	Current + Spare2 + Spare1 + Pressure Fail-safe	30			
Current + Spare2 + Spare1 + Pressure + Temperature	31				

Prg. No.	Definition of Parameter	Unit	Lower / Upper Limit	Default
P36	Configurable failure input-1 operation:	Number	0-10	0
	0 Force product into AUTO mode			
	1 Disable front panel controls			
	2 LED status indication only			
	3 LED flashes and alarm sounds while input is active.			
	4 LED flashes and alarm sounds until reset			
	5 As "4" plus engine stops.			
	6 As "2" but only while engine running.			
	7 As "3" but only while engine running.			
	8 As "4" but only while engine running.			
	9 As "5" but only while engine running.			
10 As "8" and the alternator contactor is de-energised				
P37	Configurable failure input-2 operation:	Number	0 – 10	0
	0 Force product into AUTO mode			
	1 Disable front panel controls			
	2 LED status indication only			
	3 LED flashes and alarm sounds while input is active.			
	4 LED flashes and alarm sounds until reset			
	5 As "4" plus engine stops.			
	6 As "2" but only while engine running.			
	7 As "3" but only while engine running.			
	8 As "4" but only while engine running.			
	9 As "5" but only while engine running.			
10 As "8" and the alternator contactor is de-energised				
P38	Configurable input-1 delay time	Second	0 – 10	0
P39	Configurable input-2 delay time	Second	0 – 10	0
P40	Configurable Output	Number	0 - 3	0
	0 Alarm output.			
	1 Engine running.			
	2 Ready for automatic transfer on mains failure.			
3 Preheat. +Bat V. for time period prior to operating the starter motor.				
P41	Mains contactor selection.	Number	0=Mains contactor is NO 1=Mains contactor is NC	0
P42	Operator password (P00 to P15, and P42)	Number	0000 – 9990	0000
P43	Technician password (P00 to P43)	Number	0000 – 9990	0000

3.1.1 PC INTERFACE

The PC interface kit comprises of a 9 pin D connector/FCC68(4 pin) connection lead with 2 meters of cable, and the optional PC Software (Supplied on CD-ROM, part number GEN-SOFT)

3.1.1.1 Technical Specifications

RS232 **non-isolated** serial interface

9600 Baud Rate

8 data bits, No Parity,1 Stop Bit

Maximum allowable cable length is 10 meters

3.1.2 INSTALLATION INSTRUCTION

3.1.2.1 Minimum system requirements

Processor:	486 66MHz
Operating Systems:	Windows 95/98, Windows NT, Windows 2000
Ram:	16 Mbyte
Monitor:	14" SVGA (640x480 resolution)
Fixed Disk Free Space:	5 Mbyte
Disk Drive:	CD-ROM
Communication:	An RS232 communication port is needed to communicate with the GEN-XFER Unit

3.1.2.2 Installing GEN-XFER Software

Insert the software CD into the CD-ROM drive on the PC
CD will autostart, then select GEN-XFER from the menu.

3.1.2.3 To Run GEN-XFER communication software

Press the windows START button icon, then select GEN-XFER from the program menu.

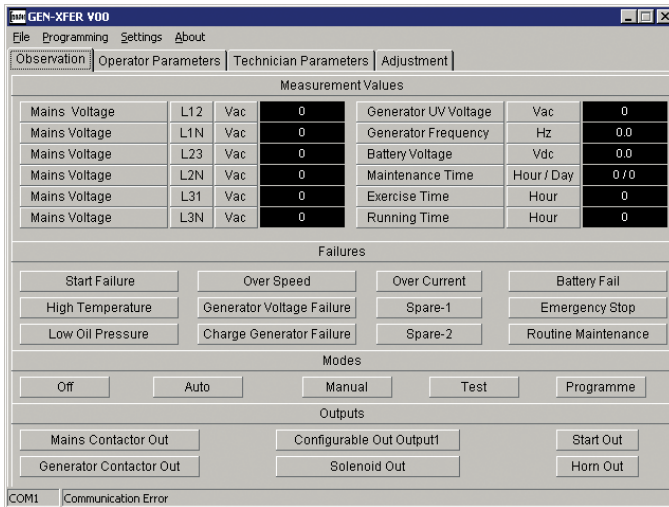
3.1.3 DESCRIPTION

GEN-XFER unit communicates with the PC using RS232 communications. The PC software allows the GEN-XFER unit's parameters and status information to be displayed on the PC screen. Operator and Technician parameters can be viewed. Parameters are password protected.

There are four windows in GEN-XFER: Observation Window, Operator Parameters Window, Technician Parameters Window and Adjustment Window.

3.1.3.1 Observation Window

In this window the values listed below can be observed.



Measurement Values

Mains Voltage
Generator Voltage
Generator Frequency
Battery Voltage
Maintenance Hour
Running Time
Exercise Time

Failures

Start Failure
High Temperature
Low Oil Pressure
Over Speed
Generator Voltage Failure
Charge Generator Failure
Over Current
Spare inputs 1 & 2
Battery Fail
Emergency Stop
Routine Maintenance

Outputs

Mains Contactor Control
Generator Contactor Control
Configurable Output-1
Solenoid output
Start output
Horn output
Serial communication port (RS-232)

Modes

Off
Auto
Manual
Test
Program

Operator Parameters Window

Operator parameters can be viewed and edited. Parameters are password protected. When the operator password is entered, it is compared with operator password that is registered inside the GEN-XFER unit.

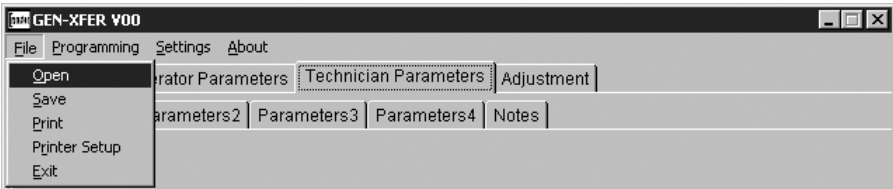
Technician Parameters Window

All parameters can be viewed and edited in this window. Parameters are password protected. When the technician password is entered, it is compared with technician password that is registered inside the GEN-XFER unit.

3.1.4 MAIN MENU

FILE

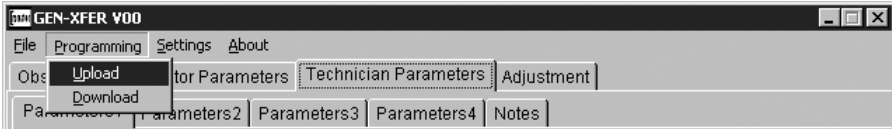
This menu allows the user to save configuration files to the disk, read from disk and write to disk.



- Open: This menu allows the user to load the registered configuration files to PC.
- Save: This menu allows the user to save the parameters with a name defined by user.
- Print: This menu allows the user to print the parameters.
- Printer Setup: This menu allows the user to select the printer that is connected to network or PC and change the configuration.
- Exit : Exit the program.

PROGRAMMING

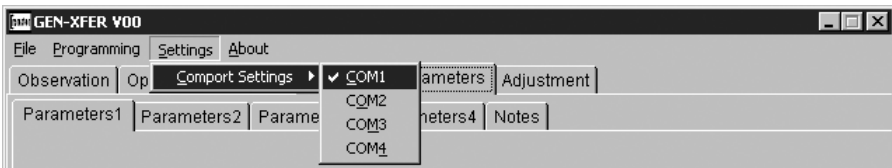
This menu is active only when the Operator or Technician Parameters Window is open. Using this menu allows the user to upload parameters from the GEN-XFER unit to the PC, or download from the PC to the GEN-XFER unit.



Download: With this menu user can load parameters from PC to GEN-XFER.

Upload: User can load the parameters stored on GEN-XFER unit to PC.

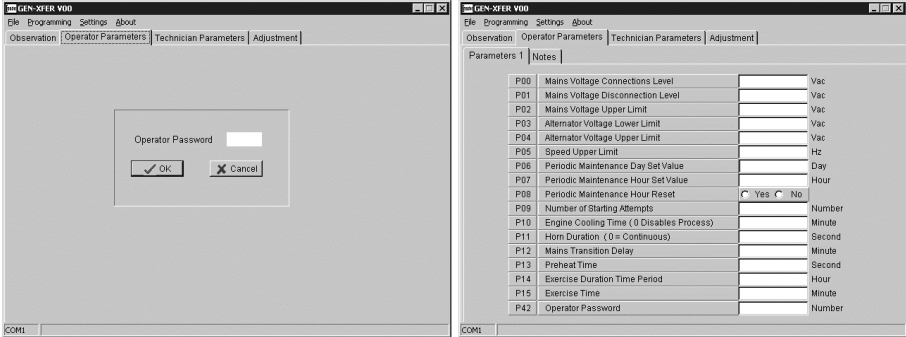
SETTINGS



Communication Port Settings: With this menu, user can determine the serial port configurations of the PC.

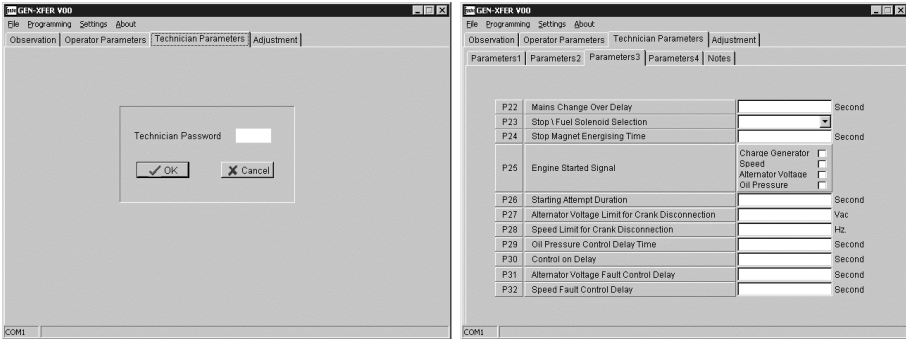
3.1.5 ENTERING THE OPERATOR PARAMETERS WINDOW

Click Operator Parameter tab. Enter the Operator Parameter password. If the password is correct, operator parameters will be viewed.



3.1.6 ENTERING THE TECHNICIAN PARAMETERS WINDOW

Click Technician Parameter tab. Enter the Technician Parameter password. If password is correct, all parameters will be viewed.



3.1.7 LOAD THE CONFIGURATION FILE FROM DISK

Click 'Open' in File menu. Choose configuration file which includes operator or technician parameters on Open Dialog Box. When the user clicks the 'Open' button on the Open Dialog Box, parameters will be transferred to PC window.

3.1.8 SAVE THE CONFIGURATION FILE TO DISK

Click 'Save' in File menu. After choosing where to save the file, enter the file name. When the user clicks the 'Save' button on Save Dialog Box, all parameters will be saved to the file.

3.1.9 UPLOAD

For loading parameters from GEN-XFER unit to PC follow the steps below. If user is in operator parameters window, only operator parameters will be viewed. If user is in Technician Parameters Window, all parameters will be viewed. Press 'Upload' in Program menu. While loading the parameters, the hour-glass cursor is displayed. Please wait for the upload operation to complete, when the cursor returns to normal.

3.1.10 DOWNLOAD

For loading parameters from PC to GEN-XFER follow the steps below. If user is in operator parameters window, only operator parameters will be loaded. If user is in Technician Parameters Window, all parameters will be loaded. Press 'Download' in Program menu. While loading the parameters, the hour-glass cursor is displayed. Please wait for the upload operation to complete, when the cursor returns to normal.

3.2 Program functions:

3.2.1 Mains Voltage

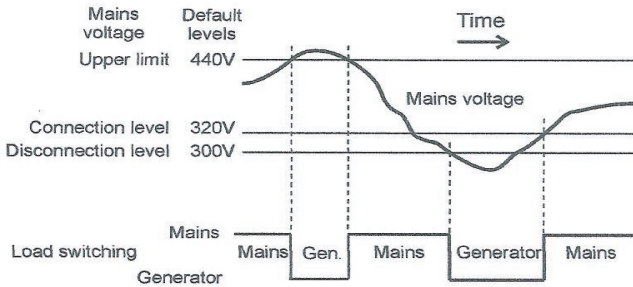
P00 Mains voltage connection level

P01 Mains voltage disconnection level

P02 Mains voltage upper limit

In Automatic mode, the unit uses these parameters to decide when to switch the load between the mains supply and the alternator – assuming the alternator is providing a satisfactory output. If the mains voltage is higher than the Upper Limit or lower than the Disconnection Level, the unit connects the load to the generator instead of to the mains.

If the load is running on the mains and the mains voltage falls, the unit will switch the load to the generator when the mains voltage falls below the Disconnection Level. Conversely, if the mains voltage is low and the load is running on the generator, the unit will not restore the mains supply to the load until the mains voltage reaches the Connection Level. This hysteresis prevents constant switching between mains and generator as the mains varies about the switching levels. Figure 3.1 shows how, in automatic mode, the load is transferred between mains and generator as the mains voltage varies over time.



3.2.2 Alternator Voltage

- P03 Alternator voltage lower limit
- P04 Alternator voltage upper limit
- P31 Alternator voltage fault control delay

A fault will be reported if the alternator output voltage goes outside the window defined by the upper and lower limits for more than the time defined as the "Alternator voltage fault control delay" (P31). The fault will only occur if the engine has been running for the period defined as the Control on delay (P30). This failure immediately stops the generating set, without cool-down delay.

3.2.3 Alternator Frequency

- P05 Speed upper limit
- P32 Speed fault control delay

A fault will be reported if the alternator output frequency exceeds the upper limit for more than the time defined as the Speed fault control delay (P32). The fault will only occur if the engine has been running for the period defined as the Control on delay (P30). This failure immediately stops the generating set, without cool-down delay.

3.2.4 Engine Cooling Time (P10)

This is the time the generator is to run off-load once the load transfer signal has ceased. This gives the engine time to cool down before shutdown. Parameter P10 Engine cooling time defines the duration of this cooling-off period.

3.2.5 Battery Voltage Lower Limit (P21)

If the battery voltage drops below the defined Battery Voltage Lower Limit, an alarm occurs and "Low Battery Failure" LED illuminates.

Solenoid selection (P23)) to provide fuel for the engine. If the GEN-XFER detects that the engine has started, it de-energises the starter motor. Engine started signals are defined by parameter P25 Engine started signals – see Section 3.2.7.

3.2.6 Engine Starting

Starting attempt duration (P26)

Number of starting attempts (P09)

When the GEN-XFER receives an Engine Start command, it energises the start solenoid to drive the starter motor and energises the Fuel solenoid (if selected – see Section 3.2.9 Stop/Fuel selection) Parameter P26 Starting attempt duration defines the maximum period for which drive will be applied to the starter motor. It makes a new attempt after a delay equal to twice the defined Starting attempt duration.

Parameter P09 Number of starting attempts defines the number of unsuccessful tries that the GEN-XFER will make before abandoning the attempts. If all these attempts fail, GEN-XFER operations are locked out and a Start Failure indication is displayed. The unit remains locked until the Failure reset button has been pressed.

3.2.7 Engine Started Signals (P25)

The GEN-XFER must de-energise the Start solenoid, to disconnect the starter motor, once the engine is running. Conversely, if the engine does not start after the pre-set start time, the unit will turn off the starter motor and start again. Hence, the unit must be able to detect when the engine has started. Four signals are available to provide engine running information, as follows:

- 0 Charging generator energising coil current. This current should fall to zero once the engine has started.
- 1 Engine speed, as selected by parameter P17 (Section 3.2.8 Speed sensing input selection (P17))
- 2 Alternator voltage, as selected by parameter P27 Alternator Voltage Limit for Crank Disconnection
- 3 Oil pressure – the oil pressure switch should open when the oil pressure is sufficient.

Any or all of these signals can be selected for use. It is advisable to select at least two of them – preferably 1) Engine speed, via magnetic pick-up, and either 0) Charging generator or 2) Alternator.

See Section 3.2.6 Engine Starting. If any of the selected signals appears, the unit assumes that the engine has started.

3.2.8 Speed Sensing Input Selection (P17)

This parameter specifies the method by which the unit monitors generator speed. The choice is between alternator frequency and external magnetic pick-up. Speed is monitored so as to detect when the engine has started. See Sections 3.2.3 Alternator Frequency, 3.2.7 Engine started signals (P25) and 3.2.6 Engine Starting.

Where alternator frequency is used, parameter P28 should be set to the frequency that must be achieved at start-up.

Where the magnetic pick-up is to be used, parameters P19 and P20 can be used to set the nominal speed of and number of teeth on the wheel that actuates the magnetic pick-up.

3.2.9 Stop / Fuel Solenoid Selection (P23)

This parameter allows the use of either a Stop solenoid or a Fuel solenoid. (See Section 3.2.6 Engine Starting.)

With Fuel Solenoid selected, the fuel solenoid will be energised while the engine is running and de-energised to cut off the fuel and stop the engine.

With Stop Solenoid selected, the stop solenoid is normally de-energised and only energised to stop the engine. The solenoid remains energised for the period defined as the Stop Magnet Energising Time (P24).

3.2.10 Stop Magnet Energised Time (P24)

This parameter sets the period for which the Stop solenoid is energised to stop the engine. It applies only where parameter P23 is set to Stop Solenoid.

3.2.11 Oil Pressure By-Pass Time (P29)

This sets the delay before a Low Oil Pressure warning will be generated. The Low Oil Pressure fault indicator will light if the oil pressure switch contact remains closed, while the engine is running, after the period defined by parameter. This period begins when the GEN-XFER has detected engine starting and has cut off the drive to the starter motor. This failure immediately stops the generating set, without cool-down delay.

3.2.12 Control On Delay (P30)

During the initial period after the engine has been started, there can be fluctuations in engine speed and alternator output that could generate spurious fault indications. Parameter P30 defines a period during which any fault indications, except High Temperature, will be ignored by the GEN-XFER. Also, in the event of a mains failure, transfer of the load from mains to generator will be delayed until the end of the Control On Delay period. This period begins when the GEN-XFER has detected engine starting and has cut off the drive to the starter motor.

3.2.13 Mains Transition Delay (P12)

In automatic mode, when the mains has been restored after an interruption, the unit will switch the load back from the generator to the mains supply after the delay programmed into P12. This delay allows time for the mains voltage to settle before reconnecting the load.

3.2.14 Configurable Failure Inputs 1 and 2 (P36 and P37) and time delay (P38 and P39)

The unit can be configured to respond in any of seven different ways to each one of these inputs. A contact closure to 0V on any of these inputs causes the horn to sound for the period programmed by P10 and lights the appropriate indicator on the panel. The GEN-XFER can be programmed to respond in one of seven ways:

- 0 Indication is unlatched – the LED flashes only while the input is 0V. This input has no effect if any other alarm condition is present.
- 1 Indication is latched. The LED flashes while the horn is sounding and then stays on until the Failure Reset button is pressed.
- 2 This is the same as 1 but, in addition, the engine is shut down.

Options 3...6 are effective only while the engine is running.

- 3 Indication is unlatched – the LED flashes only while the input is 0V. This input operates only if the engine is running and has no effect if any other alarm condition is present.
- 4 Indication is latched. The LED flashes while the horn is sounding and then stays on until the Failure Reset button is pressed. This input operates only if the engine is running.
- 5 As 4 but, in addition, the engine is shut down.
- 6 As 4 but, in addition, the generator contactor is de-energised to disconnect the load from the generator. The engine is not shut down.

3.2.15 Normal / Fail Safe Configuration for The Failure Inputs (P35)

Temperature, Pressure, Spare-1, Spare-2 and Over current failure inputs can be configured individually as a “normal” or “fail safe” input by this parameter.

3.2.16 “Power ON” Default Mode Configuration(P34)

The unit’s initial default mode is “OFF” when dc power is switched on. The default mode can be configured to “AUTO” by adjusting this parameter.

3.2.17 Force in to AUTOMODE (P36.0 , P37.0)

The configurable inputs (Pin 17, Pin 18) can be configured to force the unit in to “AUTO” mode when the input is active.

3.2.18 Disabling The Front Panel Control (P36.1 , P37.1)

The front panel controls can be disabled using these parameters (P36.1, P37.1).

3.2.19 Configurable Output (P40)

When active, this output provides battery voltage (12V or 24V) and can be programmed in one of four different ways:

- 0 Alarm output. Active when any fault is reported until reset. Can be used for either audible or visual alert.
- 1 Engine running. Active while the engine is running.
- 2 Output is active while the unit is in Manual, Test or Auto mode.
- 3 Preheat function. On starting the generator this output is active for time period defined in "Preheat Time P13" prior to running the starter motor.

3.2.20 Maintenance Indication

P06 Periodic Maintenance Day Set Value

P07 Periodic Maintenance Hour Set Value

P08 Periodic Maintenance Hour Reset

To ensure reliability, the generator must be serviced at regular intervals. The GEN-XFER can be set to indicate when a service is due. Set P06 to the number of running hours between services. Use P07 to reset the hours counter at each service. When the engine has run for the defined number of hours, the Maintenance Time LED will flash.

The maintenance alarm is also triggered after a fixed time period P06 (90-365 days).

3.2.21 Operator Password (P42)

Use this option to change the Operator password. This password allows access to program parameters P00 to P15 and P42.

3.2.22 Technician Password (P43)

Use this option to change the Technician password. It allows access to all the program parameters (P00 to P43).

3.2.23 Engine Exercise Function (P14 and P15)

P14 Time interval between exercises

P15 Exercise duration time period

This function allows the engine to be run automatically, without load, at fixed intervals, as specified by (P14). The engine runs for the number of minutes specified by (P15). Exercising will only occur if the unit is set to Auto mode when exercising is due. To disable exercising, set (P14) to zero.

3.2.24 Mains Contactor Control Selection (P41)

The contact output can be configured for Normally Open or Normally Closed contactors. Parameter value "0" (default) selects Normally Open. Value "1" selects Normally Closed.

4. Commissioning

These commissioning checks may interfere with the power supply to the load. Therefore they should not be carried out with a mission-critical load connected to the system.

4.1 Manual operation

1. Check that the unit is correctly wired and that the wiring is of a standard and rating compatible with the system.
2. Check that the correct fuses are fitted.
3. Program the unit as detailed in Section 3 Programming.
4. Take temporary steps to prevent the engine from starting. (for example, disable the fuel solenoid.)
5. After a visual inspection to ensure it is safe to proceed, connect the battery supply.
6. On the GEN-XFER, press the Man (20) button. The associated LED (11) should light.
7. Press the Engine Start (19) button. The LED (10) should light.
8. Check that the engine start sequence commences. The starter motor should run for the programmed time period (P26) for the pre-set (P09) number of times.
9. Check that the Start Failure LED flashes and the LED (10) switches off.
10. Check the unit changes to the OFF mode and the LED (12) should light.
11. Restore the engine to operational state (reconnect the fuel solenoid).
12. Press the Man (20) button. The LED (11) should light.
13. Press the Engine Start (19) button. The LED (10) should light.
14. Check the start sequence, as follows:
 - the starter motor runs
 - the engine starts
 - the starter motor disengages once the engine is running.

If not, check that the engine is fully operational (fuel available etc.) and check the wiring and programming of the GEN-XFER.
15. Check that the engine runs up to its operating speed. If not and an alarm is present, check that the alarm is valid and then check the input wiring.
16. Press the Engine Stop (18) button. At this moment the LED (9) should light. The engine should stop. Allow time for the engine to come to rest.

4.2 Auto Operation

1. Check that the mains is connected to the unit and is present.
2. Check that the remote Inhibit switch (if fitted) is set to disable (contact is open).
3. At the GEN-XFER, press the Auto (23) button. The LED (14) on the button should light.
4. Switch off the mains supply to the unit. Check that the generator starts and, after a delay, the load is transferred to the generator.
5. Restore the mains supply to the unit. Check that, after a delay, the load is transferred back to the mains and the generator, after a further delay, shuts down.
6. If a remote Inhibit switch is fitted, set it to Inhibit (contact is closed).
7. Switch off the mains supply. Check that the generator does not start.
8. Restore the mains supply and set the remote Inhibit switch to disable.

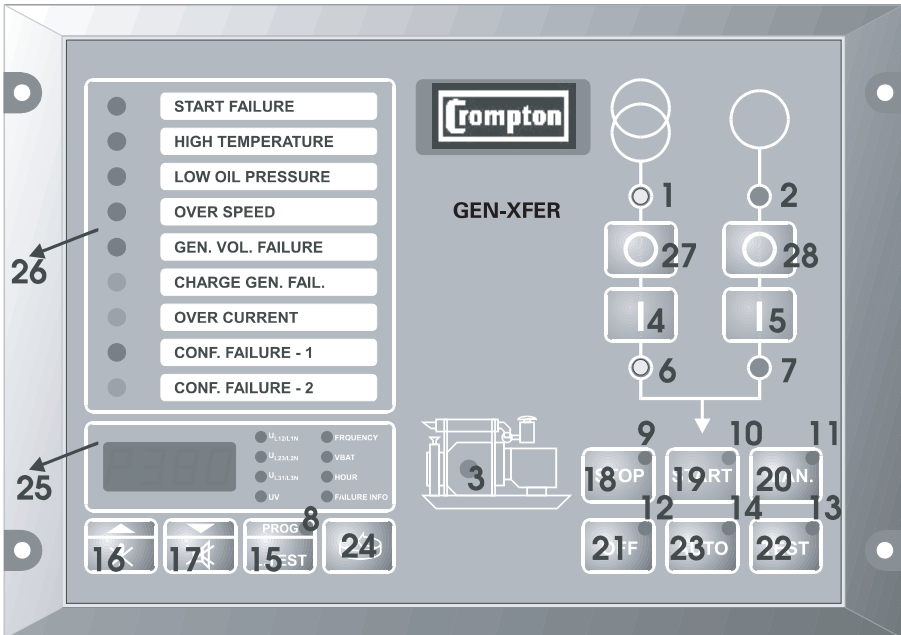
4.3 Test Mode Operation

1. Check that the mains is connected to the unit.
2. Press the Test (22) button. The LED (13) should light.
3. Check that the generator starts and that the load is still connected to the mains.
4. Switch off the mains supply. Check that the contactors change over to connect the load to the generator. Check also that the Auto (14) LED is lit. The unit changes operating mode to AUTO Mode automatically.
5. Restore the mains supply. Check that the contactors reconnect the load to the mains supply.
6. Check that the generator shuts down with cool-down period.

Section 5 Operation

5.1 Controls and Indicators

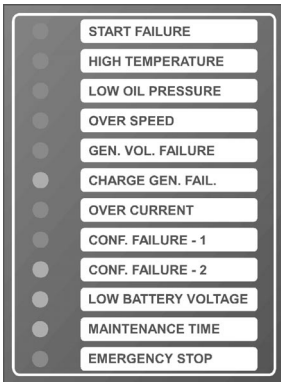
5.1.1 Front Panel Description:



Number	Comment:
1	The green LED indicates that Mains Voltage is within suitable limits and is ready to take over the load.
2	The green LED indicates that Generator Voltage is within suitable limits and is ready to take over the load.
3	The green LED indicates that the engine has started and is running.
4	This button closes the mains contactor, only operative when manual mode is selected.
5	This button closes the alternator contactor (only when manual mode is selected)
6	The LED indicates that the load is connected to the mains.

Number	Comment:
7	The LED shows that the load is supplied from the generator.
8	The red LED illuminates only when the GEN-XFER is in the Programming Mode.
9	In the MAN, AUTO and TEST modes, the red LED indicates that the engine has stopped.
10	In the MAN, AUTO and TEST modes, the green LED indicates that the engine is starting up or is running.
11	This red LED shows that the unit is in the Manual Mode.
12	This red LED shows that the unit is in OFF position.
13	This red LED shows that the Unit is in its TEST position.
14	This red LED shows that the Unit is in the AUTO position.
15	The LAMP TEST button illuminates all LED indicators and display segments. When the button is pressed for 10 seconds, the unit goes into its PROGRAMMING Mode and LED (8) illuminates.
16	This button will RESET the controller after a failure has been detected. In Programming mode, it operates as an Increment function (increase value).
17	This button will Silence the alarm horn after a failure has been detected. In Programming mode, it operates as a Decrement function (decrease value).
18	The STOP button is used for stopping the engine when the unit is in the MANUAL Mode.
19	The START button used for starting the engine when the unit is in the MANUAL Mode.
20	The MAN button is used for changing operating mode of the unit to the MANUAL Mode.
21	The OFF button is used for changing operating mode of the unit to the OFF Mode.
22	The TEST button is used for changing operating mode of the unit to the TEST Mode.
23	The AUTO button is used for changing operating mode of the unit to the AUTO Mode.
24	The Display Scroll (>>) Button is used for rotating between measurement screens in normal operation, and between programming parameters in programming mode.
25	Multi Function Display. This is used for displaying the electrical measurements during normal operation, and editing/inspecting programming parameters in program mode.
26	Failure Indicators. Detailed information available in section 5.1.3
27	This button opens the mains contactor, only operative when manual mode is selected.
28	This button opens the alternator contactor (only when manual mode is selected)

5.1.2 Failure Indicators Description:



FAILED TO START: This LED flashes if the engine has not started after the programmed number of attempts (P09). The unit must be reset, by pressing the Reset button, before a fresh attempt can be made.

HIGH TEMPERATURE: This LED flashes if the thermostatic switch on the engine indicates high temperature, while the engine is running. If this fault occurs, the unit will stop the engine without any cool-down period.

LOW OIL PRESSURE Failure: This LED flashes if the Oil Pressure Switch on the engine indicates low oil pressure while the engine is running. To obtain this indication, the engine must have been running for at least the period specified by the Oil Pressure Control Delay parameter P29. If this fault occurs, the Unit will stop the engine without any cool-down period.

OVER SPEED Failure: This LED flashes if the alternator speed goes above the Speed Upper Limit defined by parameter P05. For a fault to be indicated, the speed must be outside these limits for longer than the period defined by the Speed Fault Control Delay parameter P32. Alternator speed is measured either by measuring alternator output frequency or by monitoring an external magnetic pick-up, as selected by program parameter P17. This failure immediately stops the generating set, without any cool-down period.

VOLTAGE FAILURE: This LED flashes if the alternator output Voltage is outside of the limits programmed into Alternator Voltage Lower Limit parameter P03, and Upper Limit parameter P04, for a time period longer than the fault control delay P31. This failure immediately releases the generator contactor, and stops the generating set without any cool-down period.

CHARGING FAIL: This LED flashes if the field current for the battery charge generator fails to fall to zero after the engine has started. A fault will not be indicated if the current falls within the period defined by the Control On Delay parameter P30 after the engine has started. This failure will not stop the generating set.

OVER CURRENT Failure: The unit monitors an external Over Current relay via Pin 21 when the Generator is running and the Load is on the Generator. If the input becomes active at any time, this LED flashes and the generator contactor is released, but the engine continues to run.

CONFIGURABLE FAILURE INPUTS 1 AND 2: These LEDs indicate the status of the input Pins 17 and 18, and the controller can be programmed to perform various functions when these inputs are asserted.

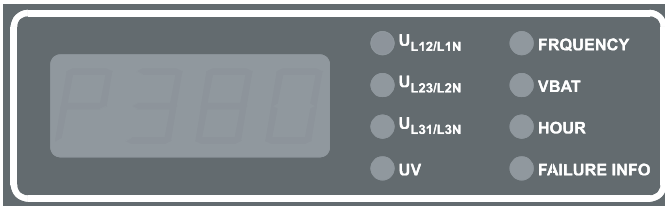
Available on GEN-XFER ND only:

LOW BATTERY VOLTAGE: This LED flashes if the battery voltage falls below the value specified by the Battery voltage lower limit parameter P21 while the engine is running. The Unit measures battery voltage at the rear terminals.

MAINTENANCE TIME: The interval (hours run) between routine maintenance, set by program parameter P07, has expired. The engine should be serviced.

EMERGENCY STOP: The remote Emergency Stop button has been pressed and has shut down the engine. Press the Reset button to remove the indication and restore GEN-XFER operation.

5.1.3 Display Mode Indicators



Four-digit, seven-segment LED display, with annunciators to indicate the parameter being displayed. Use the scroll button >> to select the desired parameter. The button selects the parameters in sequence, as follows. Note that line to line voltage readings are prefixed by **L** while line to neutral readings are prefixed by **n**.

- Mains voltage L1-L2, prefix **L**
- Mains voltage L1-N, prefix **n**
- Mains voltage L2-L3, prefix **L**
- Mains voltage L2-N, prefix **n**
- Mains voltage L3-L1, prefix **L**
- Mains voltage L3-N, prefix **n**
- UV - Alternator voltage L1
- Battery voltage (DC V)
- Timers:

Engine running time, in hours (since last reset). This is a six digit number, the first three digits are prefixed **H** (high) and the second three digits are prefixed **L** (low).

Automatic exercise timer. Elapsed waiting time (hours) to the next exercise is prefixed **E**. The exercise running time (minutes) is prefixed **r**.

- The Alarm horn LED will flash continually if the unit detects any fault. When the Display Select button is pressed so as to select this option, the display will show the cause of the fault indication. If more than one error condition is present, repeated pressing of the button will show each in turn. Possible error messages are:

- ES_tP** – Emergency Stop
- bAT1** – Low Battery Voltage Alarm
- SE_rv** – Routine maintenance due info

5.2 Mode transition

The mode can be changed at any time. A change in mode will not effect the current state of the generator or load connection. For example; if the unit is in Auto mode with the generator running and the load running on the generator, changing the mode to Manual will not effect the operating state. Any changes between Auto, Manual and Test modes will not change the operating state.

5.3 Manual Start

1. Press the Man (20) button. The LED (11) will switch on.
2. Press the Engine Start (19) button on the panel. The LED (10) will switch on. The engine should start. The sequence is as follows:

- The starter motor runs
- The engine starts

Once the engine is running,

- The LED (3) "Engine Running" illuminates.
 - The "Alternator Ready" LED (2) switches on after "control on delay" time period.
 - The generator will not supply the load unless the "Generator Ready" LED (2) is illuminated. (The contactor open / close button does not work)
3. Once both LEDs have illuminated, press the Mains contactor button (4) to disconnect the load from the mains supply. LED (6) should go off.
 4. Press the Generator contactor button (5) to connect the load to the generator supply. LED (7) should light.

5.4 Manual Stop

The LED (9) is illuminated and engine is stopped when the "Engine Stop" (18) button is pressed. When the "Engine Stop" button is pressed while the load is connected to the alternator output (generator output), the alternator contactor is released then the engine is stopped.

5.5 Auto Operation

Press the Auto (23) button to select Auto mode. The LED (14) in the corner of the button will light to indicate this mode has been selected.

In the event of a mains voltage failure, the unit will start up the generator and, once the generator is running and alternator voltage available, will transfer the load to the generator. When the mains is restored and stable, it will transfer the load back to the mains and, after a cool-down period, shut down the generator.

Note that an active (0V) input at pin 19 (Remote Inhibit) will inhibit engine running.

5.6 Test Operation

Press the Test (22) button to select Test mode. The LED (13) will switch on. This mode allows for testing of the generator off load. All alarm circuits will operate so that any faults will be reported. If a mains failure occurs while the unit is in Test mode, the unit will revert to Auto mode and will switch the load to the generator.

5.6.1 Engine Exercising

The unit incorporates facilities for exercising the engine on a regular basis. After an interval (hours) determined by program parameter P14, the unit will go into Test mode and start up the engine. The system will run in Test mode, without transferring the load to the alternator, for the period (minutes) determined by program parameter P15. At the end of this period, the unit will revert to Auto mode, shut down the engine and reset the exercise interval timer. The unit will only exercise the engine if the unit is in Auto mode when the exercise is due. If the unit is not in Auto mode at that time, the unit will restart the exercise interval timer without having exercised the engine. If the mains fails while the engine is being exercised, the unit will revert to Auto mode and transfer the load to the alternator. If the user changes the mode, the engine exercise will be abandoned and the unit will respond according to the mode selected and the current state of the mains supply.

6. Fault Finding

6.1 General

Indicators on the central section of the panel will flash if a fault is detected. See Section 5.1 Controls and Indicators. Fault conditions latch so that further operation is prevented. In any mode the unit will change to the MAN mode and STOP position when a failure is detected. If a failure is indicated, proceed as follows:

1. Find and fix the fault.
2. Press the Failure Reset (16) button to enable a restart.
3. Select the required mode of operation – Manual, Auto or Test.

6.2 Fault indications

6.2.1 Start Failure LED

This LED flashes if the engine has not started after the programmed number of attempts (P09). The unit must be reset, by pressing the Failure Reset (16) button, before a fresh attempt can be made.

6.2.2 High Temperature LED

This LED flashes if the thermostatic switch on the engine indicates high temperature, while the engine is running. If this fault occurs, the GEN-XFER will stop the engine without any cool-down period.

6.2.3 Low Oil Pressure LED

This LED flashes if the Oil Pressure Switch on the engine indicates low oil pressure while the engine is running. To obtain this indication, the engine must have been running for at least the period specified by the Oil Pressure By-Pass Time parameter P29. If this fault occurs, the GEN-XFER will stop the engine without any cool-down period.

6.2.4 Charge Generator Failure LED

The unit will indicate "Charge Generator Failure" when the voltage is not present Pin 24 of GEN-XFER in the time period defined by the "Control On Delay" parameter P30 after the engine has started.

6.2.5 Over Speed LED

This LED flashes if the alternator speed goes above the Speed Upper Limit defined by parameter P05. For a fault to be indicated, the speed must be over this limit for longer than the period defined by the Speed Fault Control Delay parameter P32.

Alternator speed is measured either by measuring alternator output frequency or by monitoring an external magnetic pick-up, as selected by program parameter P17.

This failure immediately stops the generating set, without any cool-down period.

6.2.6 Generator Voltage Failure LED

If the alternator voltage is outside of "Alternator Voltage Lower Limit" and "Alternator Voltage Upper Limit" and continues for of "Alternator Voltage Fault Control Delay" time period "Generator Voltage Failure" will occur at end of control on delay time period.

This failure immediately stops the generating set, without any cool-down period.

6.2.7 Over Current LED

The unit can monitor the status of an external Over Current Relay connected to Pin 21. If the signal at pin 21 becomes active while the engine is running, the alarm horn is activated and the load is disconnected from the generator (the generator contactor is released). A dedicated annunciator LED flashes to indicate the over current alarm status. The engine will continue to run, but the generator cannot be manually connected on load again until the Reset button has been pressed.

6.2.8 Emergency Stop LED (GEN-XFER ND only)

The remote Emergency Stop button has been pressed and has shut down the engine. After fixing the fault press Failure Reset (16) to remove the indication and restore GEN-XFER operation.

6.2.9 Low Battery Voltage message LED

Battery Voltage Failure is monitored continuously in all modes except "OFF". The LED switches on. When the battery voltage falls below the value specified by the Battery voltage lower limit parameter P21.

The GEN-XFER measures battery voltage at the GEN-XFER terminals. Depending on the size and length of the cable to the battery, this may be somewhat less than the voltage as measured at the battery.

6.2.10 Maintenance Time LED (GEN-XFER ND only)

The interval (hours run) between routine maintenance, set by program parameter P07, has expired. On completion of the required engine maintenance, reset the maintenance timer using program parameter P08.

Symptom	Possible remedy
Unit is inoperative.	Check the battery and wiring to the unit.
	Check the DC supply. (measure voltage between pins 14 and 13)
	Check the DC fuse.
Low oil pressure fault after engine has started.	Check engine oil level and pressure.
	Check oil pressure switch and wiring.
	Check that oil pressure switch type and setting of P35.
High engine temperature. Fault after engine has started.	Check engine temperature and cooling systems.
	Check switch and wiring.
	Check that temperature switch type and setting of P35.
Failed to Start fault. Engine failed to start after Pre-set number of Attempts.	Check fuel solenoid and wiring, fuel and battery. Reset the GEN-XFER and restart the engine.
	Check solenoid transistor output activated, (Fuel Solenoid if selected)
	Check the signals that the GEN-XFER is using to determine if the engine has started. Refer to engine manual.
Starter motor inoperative.	Check wiring to starter solenoid.
	Check battery supply.
	Check battery supply is present on the Start output pin 12 of the GEN-XFER.



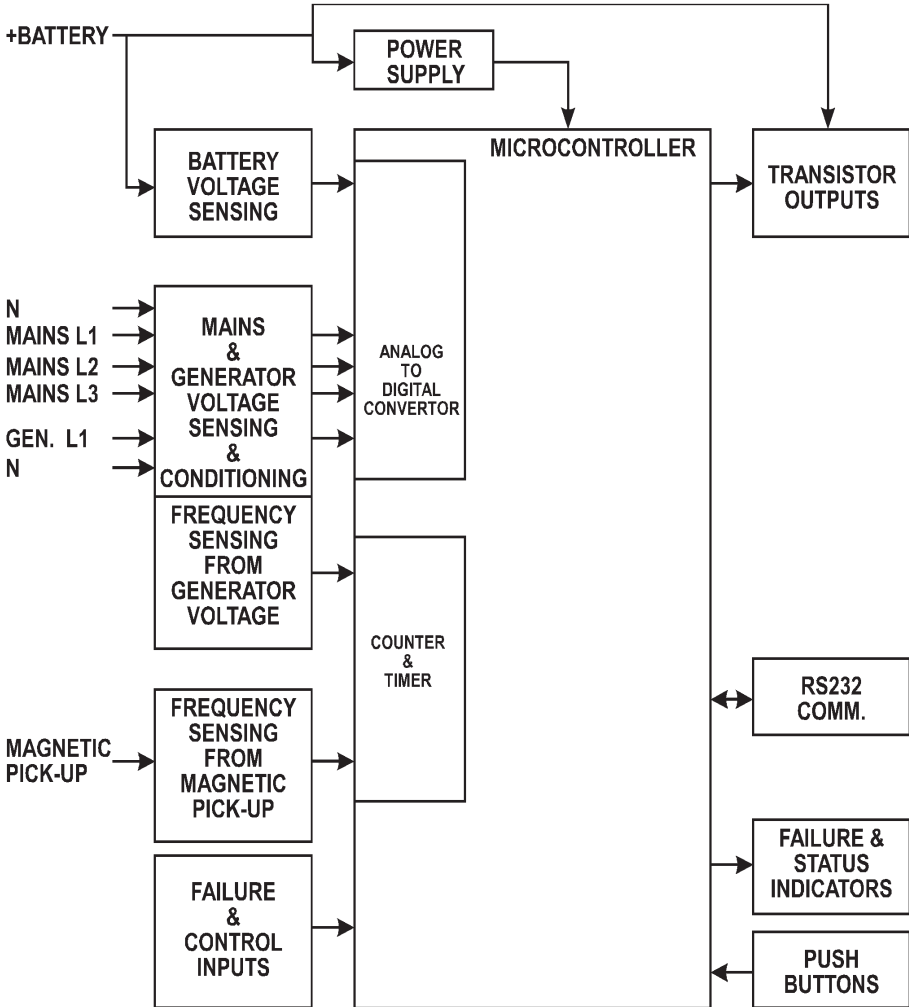
Isolate the equipment from the electricity supply during mechanical and electrical maintenance. When this is not possible, the equipment must be in the "OFF" position.

Section 7 Specifications & Ratings

Specification:	Description:
Equipment use	Electrical control equipment for generating sets
Housing & Mounting	144 mm x 204 mm x 37 mm. (including connectors) plastic housing for panel mounting.
Panel Cut-Out	138 mm x 186 mm.
Protection	IP65 at front panel, IP20 at rear side.
Weight	Approximately 0.43 Kg.
Environmental rating	Standard, indoor at an altitude of less than 2000 meters with non-condensing humidity.
Operating / Storage Temperature	-25°C to +70°C / -40°C to +85°C
Operating / Storage Humidity	93 % max. (non-condensing)
Installation Over Voltage Category	III distribution level, fixed installation category.
Pollution Degree	II, Normal office or workplace, non conductive pollution
Mode of Operation	Continuous
EMC	BS EN 50081-2, EMC Generic Emission Standard for industrial equipment
	BS EN 50082-2, EMC Generic Immunity Standard for industrial equipment
Electrical Safety	EN 61010-1, Safety Requirements for electrical equipment for measurement, control and laboratory use
DC Battery Supply Voltage	8 to 32 VDC max. operating current is 60 mA.
Cranking Dropouts	Battery voltage can be "0" VDC for max. 100 ms during cranking (battery voltage should be at least nominal voltage before cranking).
Battery Voltage Measurement	0 to 32 VDC, accuracy: 1 % FS, resolution: 0.1 V
Mains Voltage Measurement	Selectable three phase or single phase, 4 wire connection for three phase, 2 wire connection for single phase g. 35 to 300 VAC Ph-N, 10 to 110 Hz. Accuracy: 1 % FS, Resolution: 1 V
Generator Voltage Measurement	35 to 300 VAC Ph-N, 10 to 110 Hz. Accuracy: 1 % FS, Resolution: 1V.
Generator Speed (Frequency)	Selectable speed signal source from alternator voltage or magnetic pick-up.
	From alternator voltage: 10.0 to 110.0 Hz (min. 35 VAC Ph-N) Accuracy: 0.25 % FS, Resolution: 0.1 Hz.
	From magnetic pick-up: 35 to 10000 Hz (3 to 35 volts peak continuously.) Accuracy: 0.25 % FS 35 to 300 VAC Ph-N, 10 to 110 Hz., Accuracy: 1 % FS, Resolution: 1 V.

Specification:	Description:
Charge Generator Excitation	12 VDC or 24 VDC, 200 mA, max 3W.
Failure Indicators	Start failure
	High temperature
	Low oil pressure
	Over speed
	Generator voltage failure
	Charge generator failure
	Over current
	Configurable failure input-1
	Configurable failure input-2
	Low battery voltage
	Maintenance time
	Emergency stop
	Status indicators
TEST mode LED	
AUTOMATIC mode LED	
MANUAL mode LED	
Engine start LED	
Engine stop LED	
Engine running	
Mains voltage available LED	
Generator ready LED	
Mains contactor LED	
Generator contactor LED	
Transistor Outputs	Start output (max 500mA transistor)
	Solenoid output (max 500mA transistor)
	Horn output (max 500mA transistor)
	Configurable output (max 500mA transistor)
	Generator contactor control output (max 500mA transistor)
Communication interface	Mains contactor control output (max 500mA transistor)
Communication interface	RS 232 serial communication.
Contact sensing inputs	Emergency stop (NC)
	Oil pressure switch
	Temperature switch
	Remote inhibit input (NO)
	Configurable failure inputs-1
	Configurable failure inputs-2
	Over current input

Section 8 Block Diagram



Programmable Parameters:

List-1:

Prg. No.	Definition of Parameter	User Defined Value
P00	Mains voltage connections level	
P01	Mains voltage disconnections level	
P02	Mains voltage upper limit	
P03	Alternator voltage lower limit	
P04	Alternator voltage upper limit	
P05	Speed upper limit	
P06	Periodic maintenance day set value	
P07	Periodic maintenance hour set value	
P08	Periodic maintenance hour reset	
P09	Number of starting attempts	
P10	Engine cooling time	
P11	Horn duration	
P12	Mains transition delay	
P13	Preheat time	
P14	Exercise time (hour)	
P15	Exercise time (minute)	
P16	Single / Three phase selection	
P17	Speed sensing input selection	
P18	Nominal alternator frequency	
P19	Nominal speed	
P20	Tooth number	
P21	Battery voltage lower limit	
P22	Mains – Generators or Generator – Mains change over delay	
P23	Stop / Fuel solenoid selection	
P24	Stop magnet energising time	
P25	Engine started signal	
	P25.0	Charge generator
	P25.1	Speed
	P25.2	Alternator voltage
	P25.3	Oil pressure
P26	Starting attempt duration	
P27	Alternator voltage limit for crank disconnection	
P28	Speed limit for crank disconnection	
P29	Oil pressure control delay time	

Prg. No.	Definition of Parameter	User Defined Value
P30	Control on delay	
P31	Alternator voltage fault control delay	
P32	Speed fault control delay	
P33	Engine running time reset	Enter technician password to reset time to "0"
P34	"Power ON" default mode configuration	
P35	Configuration for the failure inputs	
P36	Configurable failure input-1	
P37	Configurable failure input-2	
P38	Configurable failure input-1 delay time	
P39	Configurable failure input-2 delay time	
P40	Configurable Output	
P41	Mains contactor control selection	
P42	Operator password	
P43	Technician password	

The Information contained in these installation instructions is for use only by installers trained to make electrical power installations and is intended to describe the correct method of installation for this product. However, Tyco Electronics has no control over the field conditions which influence product installation.

It is the user's responsibility to determine the suitability of the installation method in the user's field conditions. Tyco Electronics' only obligations are those in Tyco Electronics' standard Conditions of Sale for this product and in no case will Tyco Electronics be liable for any other incidental, indirect or consequential damages arising from the use or misuse of the products. Crompton is a trade mark.



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