2604

MODELLO

EUROTHERM
CONTROLS

- Singolo,doppio o tre Loop

- Controllo ad alta stabilità
- Ingresso ad alta precisione
- Controllo in Cascata
- Controllo di Rapporto
- Controllo **Override**
- Unità per espansione Digitale I/O
- Blocchi applicativi
- **Real Time Clock**
- Fino a **50 programm**i
- **500** Segmenti Rampe/Stasi

- **3 Profil**i / programma
- **16** Uscite eventi / programma

- D**isplays** personalizzabile
- Comunicazione Digitale
- Ricette PID
- **Auto tune**
- **3** Anni di garanzia
- Moduli I/O a **Plug-in**

Controllore /Programmatore ad alte prestazioni

Dati
Prodotto

Caratteristiche

Il2604 è un regolatore di temperatura e processo ad alta precisione e stabilità disponibile nella versione singolo, doppio o tre loop
Il display è del tipo doppio a 7-segment (5 digit) per visualizzare il valore della variabile esetpoint mentre con un display a LED
è possibile visualizzare messaggi di allarme, informazioni sullo stato del loop o programmatore.I messaggi sono definiti dall'utente

Il 2604 può memorizzare fino a 50 programmi ad alate prestazioni.Ciascun programma può gestire fino ad un massimo di tre profili
che potrebbero essere variabili o i setpoint di ciascun loop.

Utilizzando il toolkit blocks interno, possono essere create configurazioni per il controllo di macchine speciali,
collegando i parametri analogici o digitali ai loop di regolazione , oppure direttamente dalle funzioni logiche e matematiche.

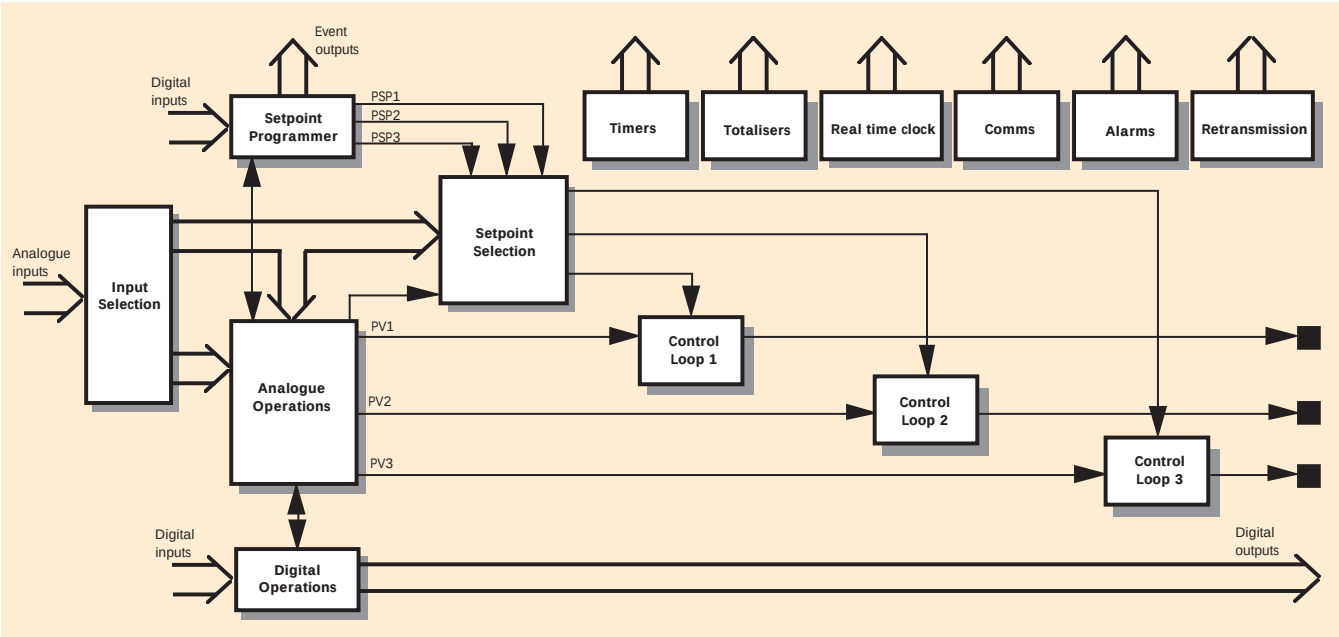
Sono disponibile un'ampia varietà di tipi d'ingressi termocoppie, PT100 e ingressi di processo.
Il collegamento con la sonda di ossigeno (zirconia) è diretto per applicazioni nei forni per il trattamento termico o ceramico.
Ciascun loop può essere configurato come PID, ON/OFF o valve positioning utilizzando diversi tipi di strategie
tipo , cascata, rapporto e Override.

La configurazione può essere fatta o da tastiera oppure dal programma software iTools il quale gira sotto Windows 95 o NT

Il 2604 contiene un circuito self-correcting (INSTANT ACCURACY®) per mantenere i dati di calibrazione
This maximises accuracy and performance during warm up and changes in ambient temperature.

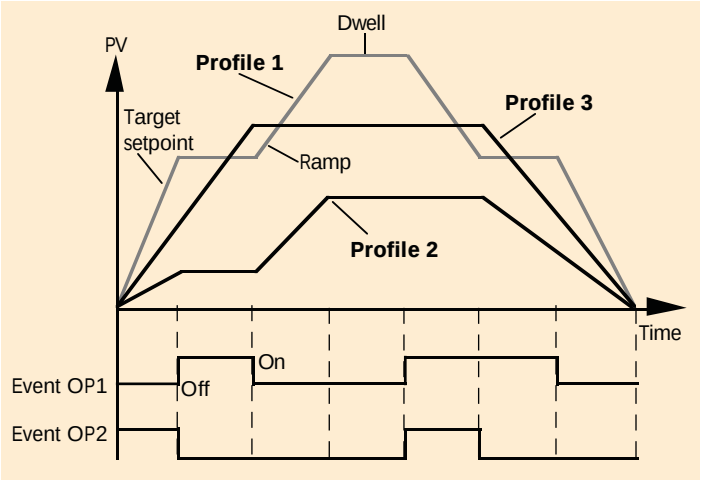
Preciso controllo PID

L'algoritmo di controllo della Eurotherm fornisce una stabilità nella regolazione, l'auto tuning aiuta calcolando per ogni loop
 i parametri PID ottimali in ogni caso esiste una funzione denominata Gain scheduling che può
each control loop, Gain scheduling can be used to automatically transfer control between up to three sets of PID values.



2604 Functional block diagram

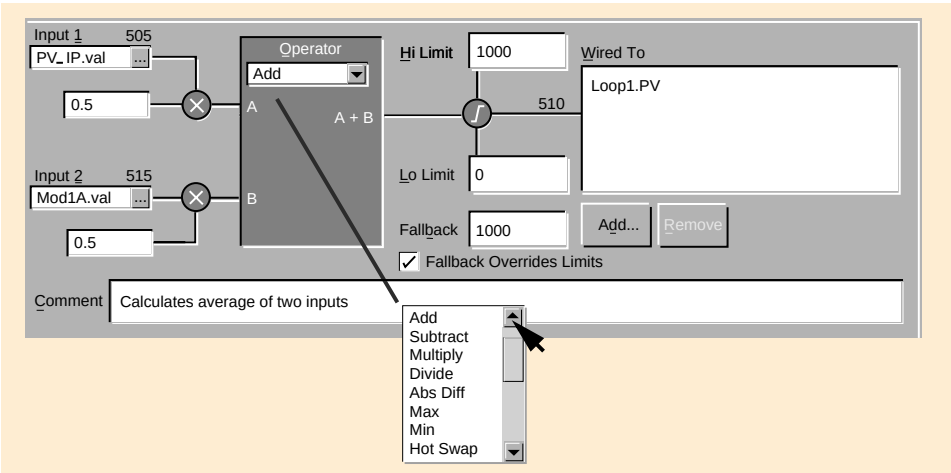
Setpoint programmer



The 2604 can store 50 programs with a maximum of 500 segments, allowing control loop setpoints to follow a predetermined series of ramp and dwell segments. Each program may profile up to three separate variables with each connected to its own control loop. Alternatively, one profile may be assigned to more than one loop.
Program segments can trigger up to 16 digital events allowing dynamic interaction functions. Digital inputs can be assigned to different programmer functions e.g. Run, Hold, Reset, Wait, etc.
A holdback function is used to ensure guaranteed dwell periods. It can be applied on a per program or per segment basis and can be active on a low, high or band deviation from the setpoint.
While a program is in hold, changes to the currently running segment are possible. In a Time to Target segment, the target setpoint and segment time remaining are editable. In a Ramp Rate segment edits can be made to target setpoint, ramp rate and time remaining, while in a Dwell segment changes can be made to current working setpoint and time remaining.
Program cycling of all or part of a program is possible by use of the loop Count or “Go Back” Segment commands.
A hot start facility provides the option for the program to start its profile at the correct segment for the current operating value of the process.

Instrument toolkit application blocks

Application blocks allow the user to create solutions by internally wiring analogue and digital operations together in flexible ways. 24 analogue and 31 digital operations as well as timers and totalisers are available.
Configuration of application blocks can be achieved either from the controller front panel interface or by using Eurotherm’s iTools configuration software.



Example of Analogue Operation

I/O Expander

The 2000 I/O DIN rail mounting expander can increase the digital I/O capability of a maximum of 20 inputs and 20 outputs. This facility provides the option for greater remote operation of the programmer and expands the 2604 controller PLC logic capability. Communication to this unit is via a 2-wire proprietary communication link.

Technical specification

Quoted at 0 to 50°C unless otherwise stated

Precision PV input

No of inputs	One standard and up to two additional PV input modules can be fitted in I/O slots 3 and 6 (isolated)
Sample rate	9Hz (110msec)
Input filtering	OFF to 999.9 seconds of filtering time constant (f.t.c.)
mV Inputs	Two ranges: ±80mV & ±40mV, used for thermocouple, linear mV source or 0-20mA with 2.5 ohm Calibration accuracy @25°C ±(1uV + 0.05% of reading), Resolution (noise free) <0.25uV (f.t.c.=1.6sec.) Drift with ambient temperature <±(0.06uV + 0.003% of reading) per °C Input impedance >100Mohms, leakage <1nA
0-2Vdc input	-1V to +2V, used for zirconia (or 0-20mA with external burden resistor of 100 ohms) Calibration accuracy @25°C ±(0.5mV + 0.05% of reading), Resolution (noise free) <10uV (f.t.c.=1.6sec.) Drift with ambient temperature <±(0.05mV + 0.003% of reading) per °C Input impedance >100Mohms, leakage <1nA
0-10Vdc input	-3V to +10V, used for voltage input Calibration accuracy @25°C ±(1mV + 0.1% of reading), Resolution (noise free) <30uV (f.t.c.=1.6sec.) Drift with ambient temperature <±(0.01mV + 0.01% of reading) per °C Input impedance = 0.66Mohms
Pt100 input	3 wire, 0 to 400ohms (-200°C to +850°C) Calibration accuracy @25°C ±(0.1°C + 0.04% of reading), Resolution (noise free) <0.01°C (f.t.c.=1.6sec.) Drift with ambient temperature <±(0.006°C + 0.002% of reading in °C) per °C Bulb current 0.2mA. Up to 22ohms in each lead without errors
Thermocouple types	Most linearisations including K,J,T,R,B,S,N,L,PII,C,D,E with error <±0.2°C Internal compensation: CJC rejection ratio >40:1 typ. CJ temperature calibration error <±0.5°C 0°C, 45°C and 50°C external compensation available. Refer to 'Ambient Temperature Rejection' document.
Zirconia probes	Most probes supported. Contact Eurotherm for details.
User Calibration	Both the user calibration and a transducer scaling can be applied
Sensor break	a.c. sensor break on each input (i.e. fast responding and no dc errors with high impedance sources)

Analogue input

No of inputs	One standard (Not isolated) Can be used with either floating or ground referenced transducers of low impedance
Input range	±10Vdc linear or 0-20mA with burden resistor of 100 ohm. The average voltage of the two inputs measured with respect to Screen or Com terminals can be up to ±42Vdc Calibration accuracy @ 25°C ±(2mV + 0.1% of reading), Resolution <0.2mV (f.t.c.=1.6sec) Drift with ambient temperature <±(0.1mV + 0.006% of reading) per °C Input Impedance: =0.44Mohm (floating input), = 0.22Mohm (ground referenced input) CMRR: >110dB at 50/60Hz, >80dB at DC (i.e. input error <1mV per 10Vdc of the input's average)
Sample rate	9Hz (110msec)
Input filtering	OFF to 999.9 seconds of filtering time constant (f.t.c.)
User calibration	Both the user calibration and a transducer scaling can be applied
Sensor break	a.c. sensor break on each input
Functions	Process variable, remote setpoint, power limit, feedforward

Standard digital I/O

Allocation	1 digital input standard and 7 I/O which can be configured as inputs or outputs (Not isolated) plus 1 changeover relay
Digital inputs	Voltage level : input active < 2Vdc, inactive >4Vdc Contact closure : input active <100ohms, inactive >28kohms
Digital outputs	Open collector, 24Vdc@40mA drive capability, requires external supply
Changeover relay	Contact rating 2A@264Vac resistive
Functions	Refer to engineering manual
Operations	1,000,000 operations with snubber fitted

Digital input modules

No of inputs	Three per module (isolated)
Allocation	Can be fitted into slots 1,3,4,5 or 6
Contact closure	Active <100ohms, inactive >28kohms
Logic inputs	Current sinking : active 10.8Vdc to 30Vdc@2.5mA inactive -3 to 5Vdc @<-0.4mA
Functions	Refer to engineering manual

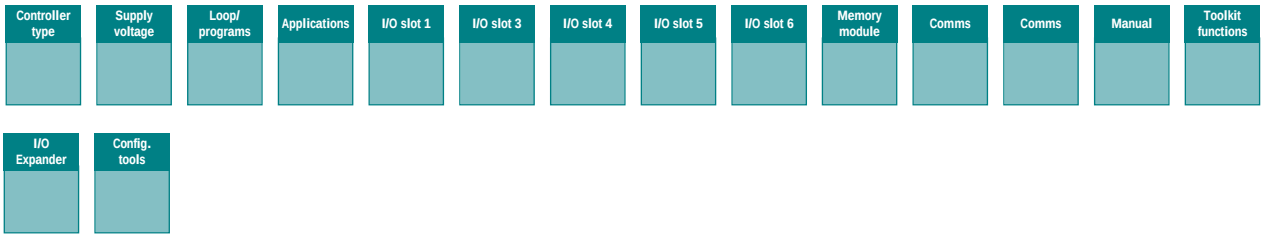
Digital output modules

Module types	Single relay, dual relay, single triac, dual triac, triple logic module (isolated)
Allocation	Can be fitted into slot 1,3,4,5 or 6 (max. 3 triac modules per instrument)
Relay rating	2A, 264Vac resistive
Logic drive	12Vdc @ 8mA
Triac rating	0.75A, 264Vac resistive
Functions	Refer to engineering manual

Analogue outputs	
Module types	1 channel DC control, 1 channel DC retransmission (5 max.) (Isolated)
Allocation	Can be fitted into slot 1,3,4,5 or 6
Range	0-20mA, 0-10Vdc (isolated)
Resolution	1 part in 10,000 (2,000-noise free) 0.5% accurate for retransmission 1 part in 10,000 2.5% accurate for control
Functions	Refer to engineering manual
Transmitter PSU	
Allocation	Can be fitted into slots 1,3,4,5 or 6 (Isolated)
Transmitter	24Vdc@20mA
Digital communications	
Allocation	2 modules fitted in slots H & J
Modbus	RS232, 2 wire or 4 wire RS485, max baud 19.2kB in H module & 9.6kB in J module (Isolated)
Alarms	
No of Alarms	Input alarms (2), loop alarms (2) User alarms (8)
Alarm types	Full scale, deviation, rate of change, sensor break plus application specific
Modes	Latching or non-latching, blocking, time delay
Parameters	Refer to engineering manual
User messages	
No of messages	Maximum 50, triggered by operator or alarm or used for custom parameter names
Format	On LED display, 2 lines x 16 characters
Control functions	
No of loops	One, two or three
Modes	On/off, PID, motorised valve without feedback
Options	Cascade, ratio, override or feed forward
Cooling algorithms	Linear, water, oil or fan
PID sets	3 per loop (Cascade loop includes master and slave parameters)
Manual mode	Bumpless transfer or forced manual output, manual tracking available
Setpoint rate limit	Display units per second, minute or hour
Setpoint programmer	
No of programs	A maximum of 50 programs assignable over 500 segments. a program can consist of up to 3 variables. Programs can be given user defined 16 character names
Event outputs	Up to 16, can be assigned individually to segments or called as part of a event group
Advanced functions	
Application blocks	31 digital operations
	24 Analogue calculations
Timers	4 On delay, maximum time 500hours, trigger & reset input
Totalisers	4, trigger level & reset input
Real time clock	Day of week and time (Year 2000 compliant)
General specification	
Display range	5 digits including up to 3 decimal places
Supply	85-264Vac, 20Watts (max)
Operating ambient	0 - 50°C and 5 to 95% RH non condensing
Storage temperature	-10 to +70°C
Panel sealing	IP54
Dimensions	96H x 96W x 150D (mm)
EMC standards	EN50081-1 & EN50082-2 generic standards - suitable for domestic, commercial and light industrial as well as heavy industrial environments
Safety standards	Meets EN61010 installation category II, pollution degree 2
Atmospheres	Not suitable for use above 2000m or in explosive or corrosive atmospheres

Ordering information

It is only necessary to order the hardware required. In this instance, you need only complete the hardware configuration code. Completion of the quick start code opposite will assist you in configuring the 2604.
If you require Eurotherm to supply a **fully configured product**, you can use the iTools configuration software to generate a clone file which will be downloaded into the 2604 prior to shipment. Eurotherm will then assign a specific number to your instrument allowing you to easily re-order the same configuration. If you have not previously purchased iTools, please contact your local Eurotherm sales office.



Controller type

2604	Standard

Supply voltage

VH	85-264Vac

Loop/programs

First digit

1--	One loop
2--	Two loops
3--	Three loops

Second digit

-XX	No programs
-2-	Twenty programs
-5-	Fifty programs

Third digit

-XX	No programs
--1	1 Profile
--2	2 Profile
--3	3 Profile

Applications

XX	Standard
ZC	Zirconia

I/O slots 1,3,4,5,6

XX	None fitted
R4	Change over relay
R2	2 Pin relay
RR	Dual relay
T2	Triac
TT	Dual triac
D4	DC Control
D6	DC retransmission
PV	PV Input (slots 3 & 6 only)
TL	Triple logic input
TK	Triple contact input
TP	Triple logic output
MS	24Vdc transmitter PSU

Memory module

XX	Not fitted
MM	Fitted

Comms

Both slots

XX	None fitted
A2	EIA-232
Y2	2-wire EIA-485
F2	4-wire EIA-485

Manual

ENG	English
FRA	French
GER	German
ITA	Italian
NED	Dutch
SPA	Spanish
SWE	Swedish

Toolkit functions

XX	Standard
U1	16 Analog + 16 Digital
U2	24 Analog + 31 Digital

I/O Expander

XX	None
E1	10 in and 10 out
E2	20in and 20 out

Config tools

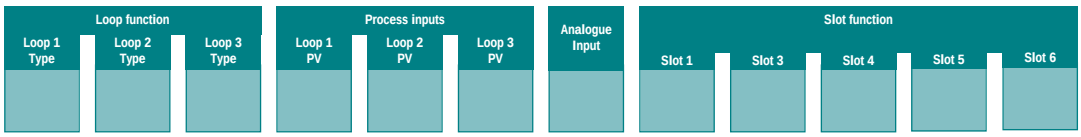
XX	None
IT	iTools

Hardware code example:

2604/VH/323/XX/RR/PV/D4/TP/PV/XX/A2/XX/ENG/U1/E1/IT

This code describes a 3 loop controller with capability to store 20 three profile programs.
Supply voltage is 85-264Vac.
Modular hardware: 2 x PV input, 1 x Dual relay, 1 x DC control, 1 x Triple logic output
EIA-232 Comms
16 analogue and 31 digital operations
10in/10out Expander and iTools supplied with controller

Quick start code



Loop function	
XXX	None
VP1	VP without feedback
PID	PID Control

Process inputs (Input type)	
X	None
J	J Thermocouple
K	K Thermocouple
T	T Thermocouple
L	L Thermocouple
N	N Thermocouple
R	R Thermocouple
S	S Thermocouple
B	B Thermocouple
P	Platinell II
C	C Thermocouple
Z	RTD/Pt100
A	4-20mA linear
Y	0-20mA linear
W	0-5Vdc linear
G	1-5Vdc linear
V	0-10Vdc linear
Custom downloads (replace C)	
D	D thermocouple
E	E thermocouple
1	Ni/Ni18%Mo
2	Pt20%Rh/Pt40%Rh
3	W/W26%Re (Engelhard)
4	W/W26%Re (Hoskins)
5	W5%Re/W26%Re (Engelhard)
6	W5%Re/W26%Re (Bucose)
7	Pt10%Rh/Pt40%Rh

Analogue input	
XXX	None
P2-	PV Loop 2
P3-	PV Loop 3
S1-	SP Loop 1
S2-	SP Loop 2
S3-	SP Loop 3
Input range	Select third digit from table 1

Table 1	
A	4-20mA linear
Y	0-20mA linear
W	0-5Vdc linear
G	1-5Vdc linear
V	0-10Vdc linear

Slot function	
XXX	Unconfigured
1--	Loop no. 1
2--	Loop no. 2
3--	Loop no. 3
Single relay or triac	
-HX	PID Channel 1
-CX	PID Channel 2
Dual relay or triac	
-HC	PID Heat & Cool
-VH	VP Heat
-AA	FSH & FSH
-AB	FSH & FSL
-AC	DH & DL
-AD	FSH & DH
-AE	FSL & DL
Triple logic output	
-HX	CH1 Heat
-CX	CH1 Cool
-HC	CH 1 Heat, CH2 Cool
DC outputs	
-H-	PID Heat
-C-	PID Cool
-T-	PV retransmission
-S-	SP retransmission
For output range select third digit from table 1	
Precision PV input	
-PV	PV input module

Notes:

1. Loop 1 PV defaults to main input on microboard. Loop 2 and 3 PV inputs must be fitted in I/O slots 3 or 6 or be assigned to the analogue input.
2. This alarm configuration refers to loop alarms only. One selection is allowed per loop. Additional alarms are available for the user to configure.
3. Thermocouple and RTD inputs assume sensor min and max values with no decimal point.
4. Linear inputs are ranged 0-100%, no decimal point.
5. Temperature inputs will be C unless ordered by USA where F will be supplied.
6. Remote setpoints assume loop min & max ranges.

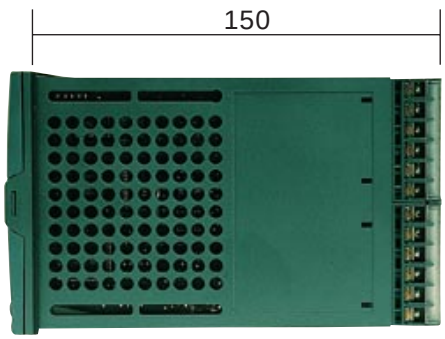
Quick start code example:

VP1/PID/PID/K/Z/A/S1A/1VH/2PV/2HV/3HC/3PV

This code configures the hardware specified on the previous page to be:
Loop 1: Valve position control, Type K input, Heat VP output in slot 1, 4-20mA remote setpoint input
Loop 2: PID control, RTD input in slot 3, 0-10Vdc Heat output in slot 4.
Loop 3: PID control, 4-20mA input in slot 6, Logic heat/cool output in slot 5.

Dimensional details

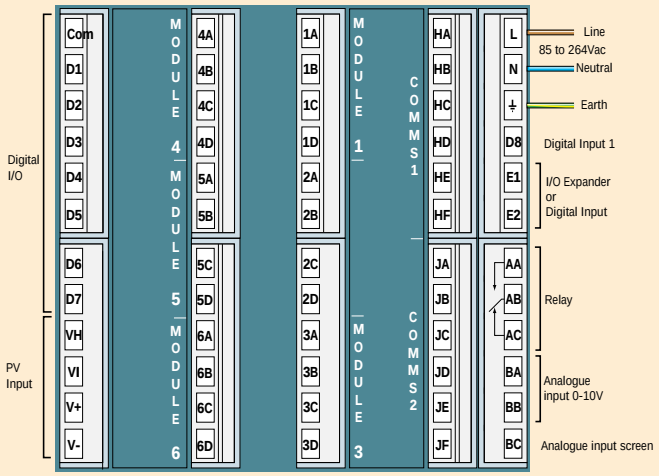
All dimensions in mm



Panel cut-out

92 x 92 $^{-0.0}_{+0.8}$

Rear terminal connections



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