



Data sheet

ECL Apex 20 controller

Description



ECL Apex 20

ECL Apex 20

The ECL Apex 20 is used in large district heating applications. The product is designed and produced by the company Saia-Burgess.

The ECL Apex 20 is a free programmable controller (FPC / PLC) for temperature and pressure control as well as monitoring of district heating systems.

The ECL Apex 20 is operated by means of a PC.

Temperature input signals are based on Pt 1000 or 0 - 10 V.

Pressure input signals are based on 0 - 10 V. Activation of the motorized control valves is based on 0 - 10 V signals. Activation of the pumps is based on relay outputs.

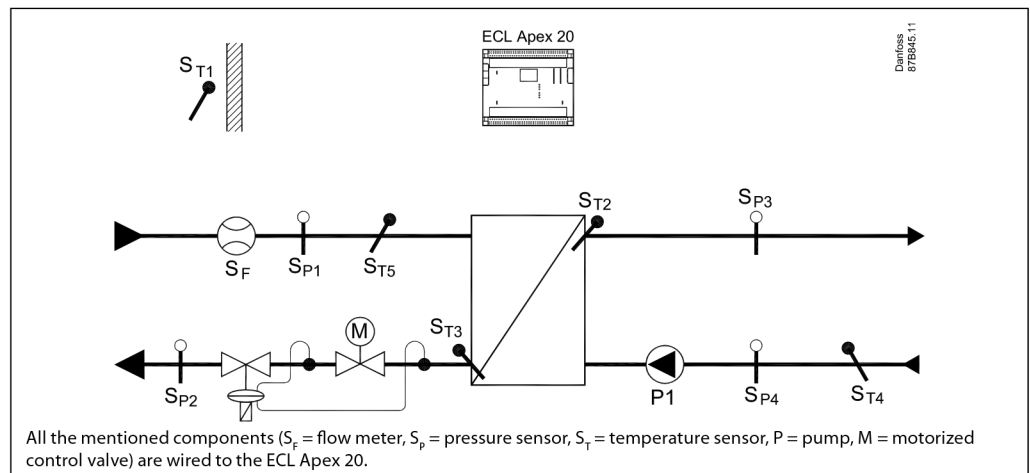
The advantages of the ECL Apex 20 are among others:

- Free programmable controller
- Flexible input and output configuration and extension
- Flexible communication possibilities
- Onboard web server

The ECL Apex 20 is to be placed inside a panel.

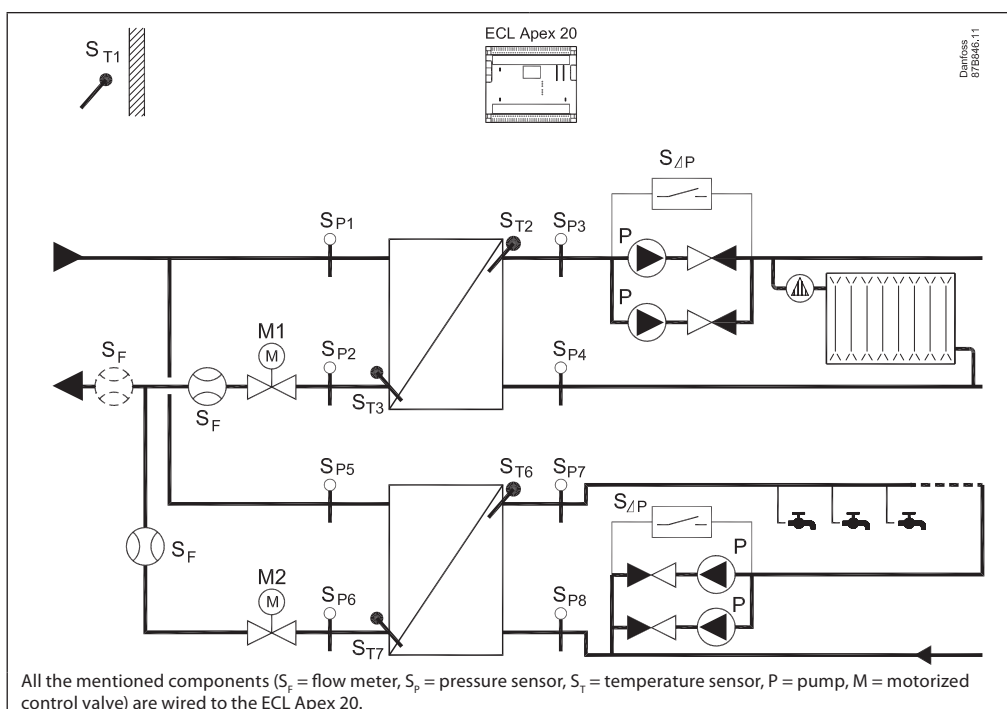
Application

Example 1:



Application

Example 2:



Ordering

ECL Apex 20 controller

Type	Designation	Code No.
ECL Apex 20	Controller (Saia-Burgess: PCD2.M5540 equipped with one G4 I/O module). Supplied with the product: • Battery (CR 2032) for time back-up • Installation guide • Connectors (with numbers) for power etc.	087B2506

Extension modules

Type	Designation	Code No.
Saia-Burgess standard modules	PCD2.E110 (input, 8 x digital) PCD2.E165 (input, 16 x digital) PCD2.A200 (output, 4 x relays, NO) PCD2.A220 (output, 6 x relays, NO) PCD2.W200 (input, 8 x 0 - 10 V.) PCD2.W220 (input, 8 x Pt 1000 temperature sensor) PCD2.W400 (output, 4 x 0 - 10 V) PCD7.D3100E (display for insertion in the ECL Apex 20)	*)
Saia-Burgess memory module	PCD7.R551M04 (flash memory, 4 MB)	*)
Saia-Burgess extension housing	PCD2.C2000 Use PCD2.K106, connection cable between ECL Apex 20 and extension housing	*)
Saia-Burgess PCD MB Panel 7" TFT	WVGA PCD7.D470WTPZ11	*)

*) To be purchased at the local Saia-Burgess representative at agreed conditions

Accessories

Type	Designation	Code No.
PG5	Programming Software. To be purchased at a local Saia-Burgess representative at agreed conditions.	*)

*) Not supplied by Danfoss

Ordering (continued)

Pt 1000 temperature sensors (1000 ohm / 0 °C)

Type	Designation	Code No.
ESMT	Outdoor temperature sensor	084N1012
ESM-10	Room temperature sensor	087B1164
ESM-11	Surface sensor	087B1165
ESMB-12	Universal sensor	087B1184
ESMC	Surface sensor incl. 2 m cable	087N0011
ESMU-100	Immersion sensor, 100 mm, copper	087B1180
ESMU-250	Immersion sensor, 250 mm, copper	087B1181
ESMU-100	Immersion sensor, 100 mm, stainless steel	087B1182
ESMU-250	Immersion sensor, 250 mm, stainless steel	087B1183

Technical data

	ECL Apex 20
Supply voltage Must be a class 2 transformer (double isolated)	24 V d.c., +25% / -20%, min. 0.6 A
Ambient temperature	Placed on vertical surface: 0 - 55 °C Other positions: 0 - 40 °C
Storage temperature	-20 - 85 °C
Humidity	10 - 95% RH, without condensation
IP class	IP 20 (to be mounted in a protection panel)
Enclosure, material	PC / ABS
Mounting	On 2 x top hat rails of each 35 mm width, mounted in parallel or with 4 x M4 screws
Data and clock backup	Lithium battery CR 2032
Max. input / output	1024 (when PCD2.C2000 extension housings are used)
Max. input / output modules	61 (G4 I/O module incl.)
Weight	0.95 kg + (5 modules x 0.04 kg) = 1.15 kg
- marking in accordance with the standards	EMC (ElectroMagnetic Compatibility Directive) LVD (Low Voltage Directive) RoHS (Restriction of Hazardous Substances Directive)

Software for programming

The ECL Apex 20 is programmed by means of the software PG5.

Programming methods offered:

- S-Edit (instruction list)
- GRAFTEC (sequential function chart)
- FUPLA (function block diagram)

ECL Apex 20 controller, description

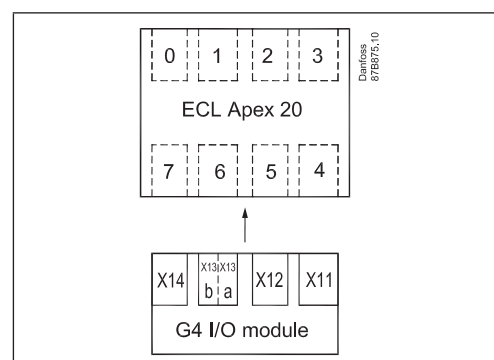
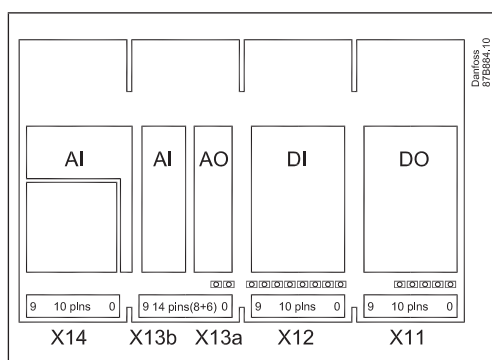
The ECL Apex 20 is delivered with a G4 I/O module containing 4 connectors: X11, X12, X13 and X14:

Slot 0: Empty
Slot 1: Empty
Slot 2: Empty
Slot 3: Empty
Slot 4: X11, digital output (DO), 5 x relays NO

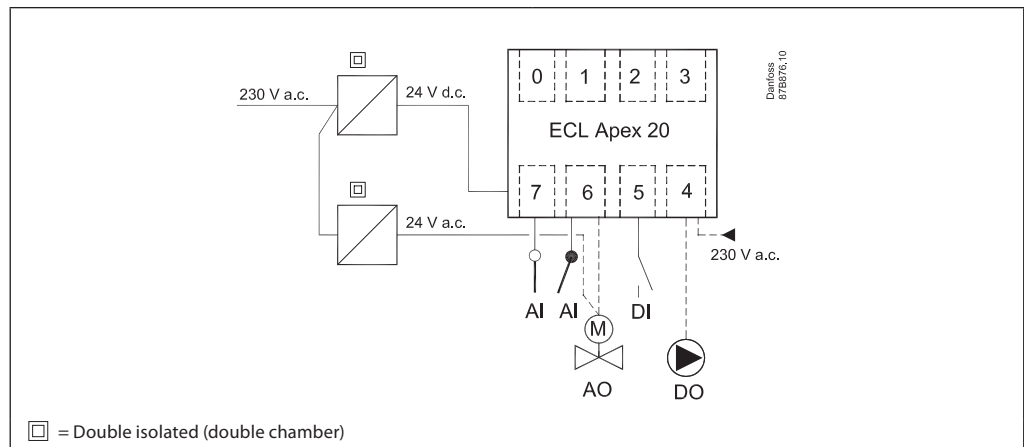
Slot 5: X12, digital input (DI), 10 x DI
Slot 6: X13a, analog output (AO), 3 x 0-10 V
X13b, analog input (AI), 5 x Pt 1000
Slot 7: X14, analog input (AI), 9 x 0-10 V
or 0-20 mA

Slots 0, 1, 2 and 3 can be used for additional modules.

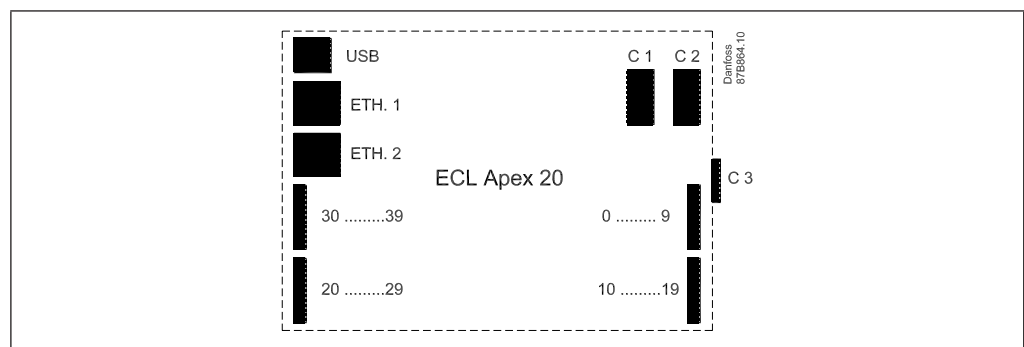
G4 I/O module and numbering of slots



Electrical wiring



ECL Apex 20, connections



USB	Service port (USB B-type), connection to PC
ETH1	Ethernet 1
ETH2	Ethernet 2
30 ... 39	"User I/O"
20 ... 29	Supply 24 V dc Terminals 20 + 21 + 22 = + (plus) Terminals 23 + 24 = - (minus)

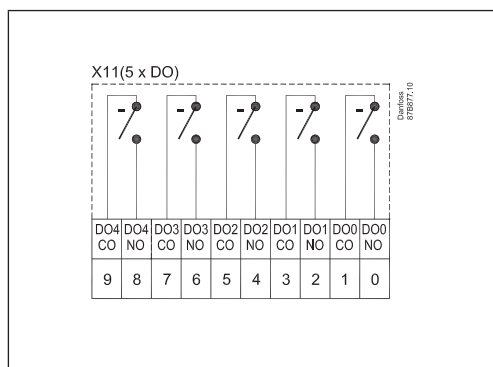
C 1	S-Net / MPI
C 2	Com / PGU
0 ... 9	Port 2
10 ... 19	Port 1
C 3	I / O Bus extension

ECL Apex 20, communication

Type	Description	Remarks
ModBus	The RS 485 port is used. A driver for ModBus must be downloaded to the ECL Apex 20 via the programming software PG5.	
Ethernet, RJ45	The communication between the ECL Apex 20 and the internet.	
USB connector	Service port (connection to the PC). For programming of the ECL Apex 20.	
M-Bus	An RS 232 connection is established to an M-Bus master. The M-Bus master has the connection to the heat meters.	The heat meters used in the application requires a driver, delivered by Saia-Burgess. The driver is downloaded to the ECL Apex 20.

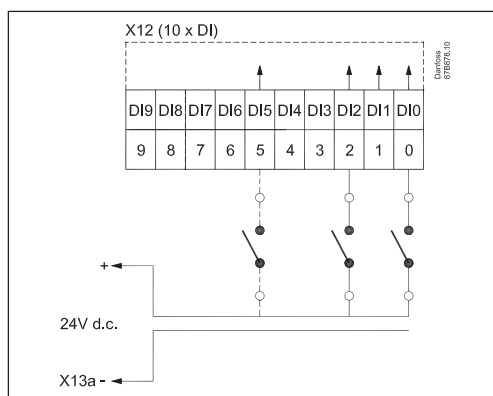
G4 I/O module

X11, digital output (DO)



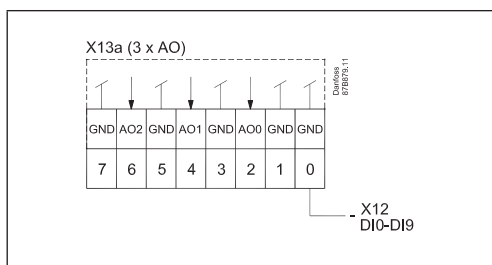
Output type	Relay contacts, NO (Normally Open), SPST (Single pole, single throw)
Number of outputs	5
Terminals	10 pcs. screw-type, each max. 2.5 mm ²
Active output indication	One LED per output, green
Max. load	2 A at 250 V a.c., AC1 1 A at 250 V a.c., AC11 2 A at 50 V d.c., DC11 1 A at 24 V d.c., DC11
Built-in varistor for contact protection	Not present!

X12, digital input (DI)



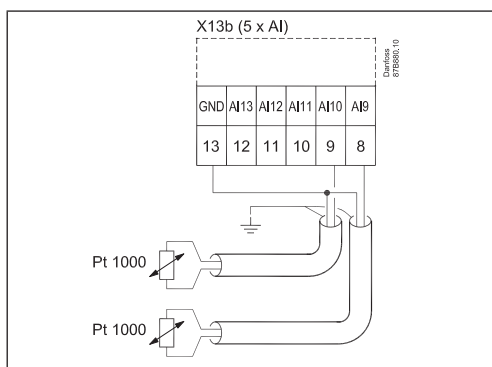
Input type	Switch
Number of inputs	10
Terminals	10 pcs. screw-type, each max. 2.5 mm ²
Active input indication	One LED per input, red
Input activation	Source or sink operation
Logic "0"	-30 V < V.in < 5 V
Logic "1"	15 V < V.in < 30 V
Input current	4 mA per input at 24 V d.c.
Input delay	8 ms typically

X13a, analog output (AO)



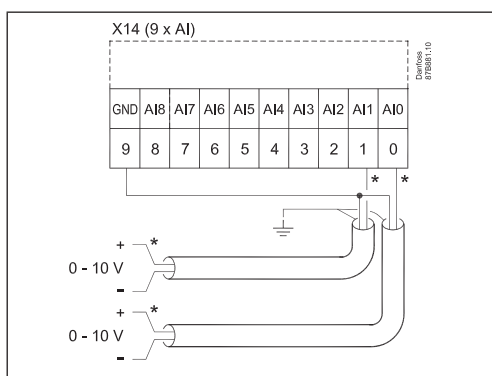
Output type	0 - 10 V d.c.
Number of output	3
Terminals	8 pcs. screw-type, each max. 1.5 mm ²
Resolution	12 bit
Max. load	3 K ohm
Accuracy, output signal	± 1% (= ± 50 mV)
Protection	Outputs protected against short-circuiting

X13b, analog input (AI)



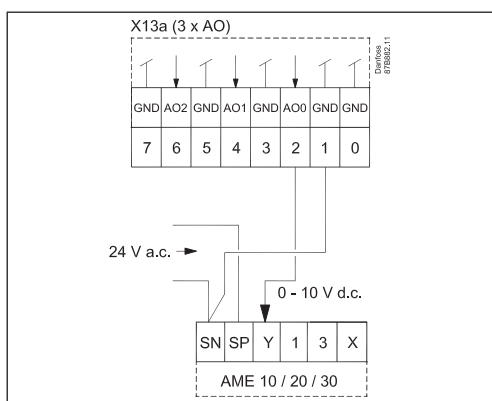
Input type	Pt 1000 temperature sensor
Number of input	5
Terminals	6 pcs. screw-type, each max. 1.5 mm ²
Connection cable	Shielded type, grounded at the ECL Apex 20
Input resistance	7.5 K ohm
Max. measuring current	1.5 mA
Over-voltage protection	+ / - 50 Volt
Conversion time	< 50 µsec
Resolution	10 bits

X14, analog input (AI)

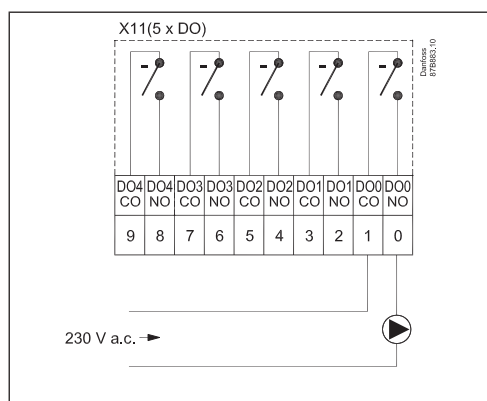


Input type	0 - 10 V / 0-20 mA
Number of input	9
Terminals	10 pcs. screw-type, each max. 2.5 mm ²
Connection cable	Shielded type, grounded at the ECL Apex 20
Input resistance	20 K ohm
Over-voltage protection	+/-35 V
Resolution	10 bits

Connection examples

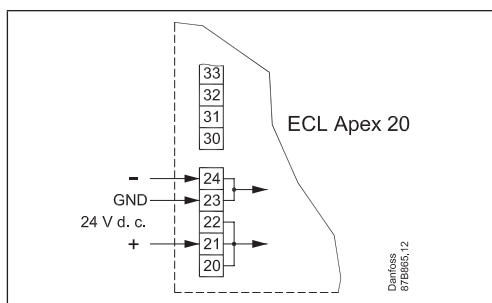


Example 1:
0 - 10 V d.c. control of AME electrical actuators



Example 2:
230 V a.c. control of circulation pump

ECL Apex 20, power connection



Technical literature and additional information

Type	Description	Lit. No.
Technical manual, ECL Apex 20	The original Saia-Burgess Manual. 229 pages, 10 MB pdf file.	*)
Demo applications	Available on the Saia-Burgess website: www.sbc-support.ch	
Installation guide (ECL Apex 20)	Supplied with the product	VIKTT

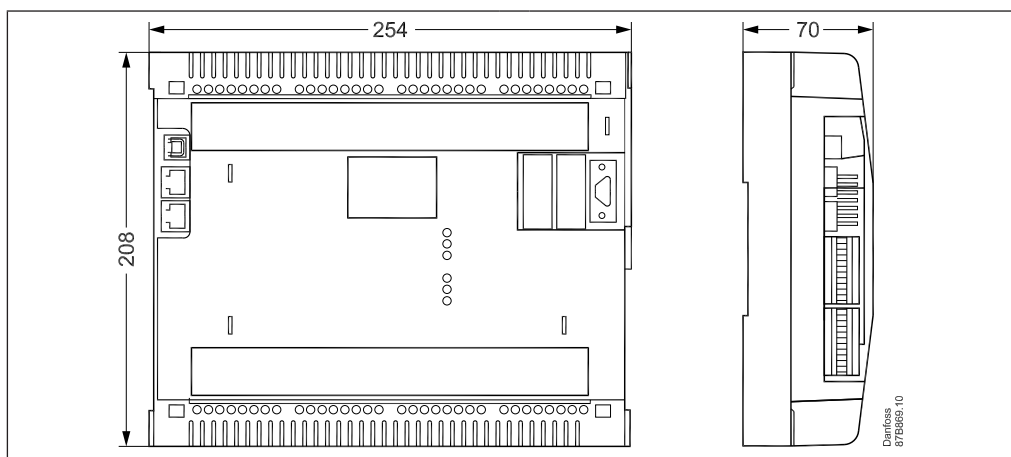
*) Available on the Saia-Burgess website: www.sbc-support.com. Choose *Programmable Controller* and PCD2.M5xxx.

Visit the Internet for Danfoss literature on <http://danfoss.com/>

Use the product search facility or choose *Documentation* to find the literature you require.

Dimensions (mm)

ECL Apex 20	Width x height x depth	254 x 208 x 70
--------------------	------------------------	----------------





Additional documentation for ECL Apex 20 controller on <http://danfoss.com/>

Danfoss A/S

Climate Solutions • danfoss.com • +45 7488 2222

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product.

All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.
