ELECTRIFICATION PRODUCTS

RVT
Smart power factor controller
(Canadian edition)

RVT product overview
Auto cap bank control

Unique features of RVT	Benefit to customer/user
Full colour touch-screen with menu-driven paramater settings and "smart" functions	Fast and easy to program, key network data available on a single screen in real-time
Smart features and password protected	Intuitive and safe operation
Multiple communication options	Easy link-up with other systems, full read/write
Programmable protection thresholds	Better alarming and monitoring options
Multi-language interface	English and French included
Rugged build with wide operating temperature	Reliable operation over a long period of time
Direct voltage input up to 690V	PT not required in LV banks
Help button available on all screens	Help available on the device, exactly when it is most needed
Real-time clock (RVT12 only)	Time-stamping of events and alarms
Takes Cl.1 CT of 5A or 1A output	Flexible to use existing CT's
Full data readout - V (L-L, L-N), I (L-L, L-N), KW, KVA, KVAR, cosϕ (average and by phase), etc.	Network data available on the display (as well as data ports) for monitoring and analysis
Harmonics spectrum display available in real-time	Any harmonics on the network (H1 to H49) is immediately flagged = unique value-add

RVT dashboard legend:

- active o/p
- s/w unlocked
- s/w locked
- comms locked
- comms unlocked
- warning
- on demand
- off demand
- manual mode
- setting mode
- auto mode
- temp. alarm
- temp normal
- h/w locked
- h/w unlocked
- alarm active
- alarm inactive
- Mode change mode
- online help
- close screen
- OK validate
- next page

Quick-start guide
Easy commissioning

1. Select the “Settings” menu

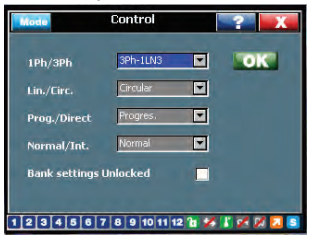
2. Select commissioning

3. Select "Automatic"

4. Press OK

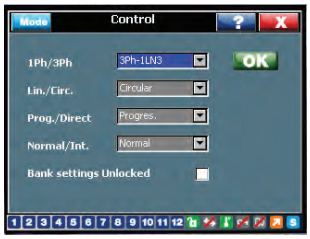
5. Press OK

6. Select connection type and press OK



7. Press OK

8. Lock/unlock "Bank settings" and press OK



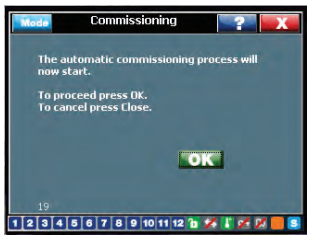
9. Press OK

10. Press OK

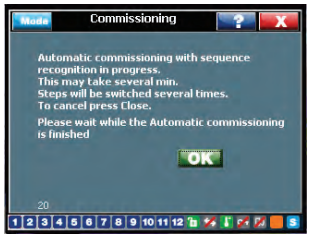
11. Press OK

12. Input CT scaling = 50

13. Press OK



14. Press OK



15. Press OK

16. Press OK

17. Press OK

18. Press OK

19. Press OK

20. Press OK

21. Press OK

... and automatic commissioning is now complete.

Note:

Programming features are common between RVT-6TS and RVT-12TS-3P.

For details on how to access and set specific parameters in the various RVT menus, please request and refer to the latest RVT User Manual.

Technical specifications
RVT-6TS and RVT-12TS-3P

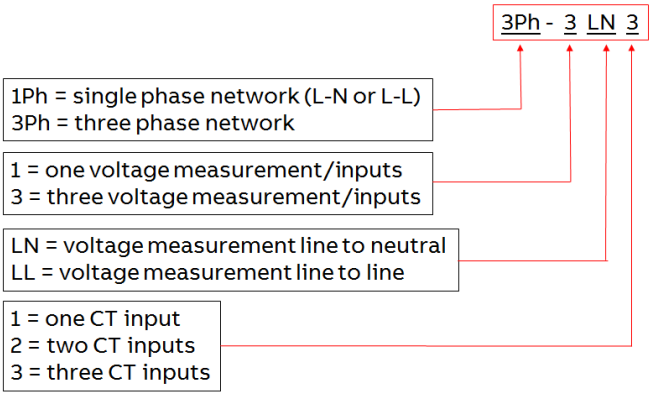
Parameter	Description
Measuring system	Micro-processor system for balanced 3-ph/1-ph networks and unbalanced network. Power factor control by individual phase available.
Supply voltage	100 to 460 Vac
Consumption	15 VA max.
Connection for measurement and control voltage	Phase to phase (L-L) or phase to neutral (L-N) for balanced and unbalanced networks
Voltage tolerance	±10% on the indicated supply voltage
Measurement category (IEC61010-1)	CAT 3
Voltage measurement	up to 690V (higher voltages possible with suitable voltage transformer)
Accuracy	±1% at full scale
Frequency range	45 or 65 Hz (auto-adjusts to network)
Current input	5A or 1A (rms) with Class1 current transformer
Current input impedence	<0.1 Ω
Power outage release	Auto-disconnection of all capacitors in case of power outage >20ms.
Number of outputs	Programmable up to 6 outputs (RVT-6TS) or 12 outputs (RVT-12TS-3P)
Output contact ratings	Max. continuous current = 1.5A at 250Vac or 0.3A at 110Vdc Max. peak current = 5A Max. voltage = 440Vac Terminal A-A rated to 18A continuous (hence 9A per terminal)
Alarm contact rating	1NO+1NC contacts rated to 1.5A at 250Vac (max. breaking voltage = 440Vac)
Fan contact rating	1NO contact rated to 1.5A at 250Vac (max. breaking voltage = 440Vac)
Digital inputs	Optocoupler isolated inputs rated 15 to 24 Vdc Input1 = day/nigh cosϕ selection Input2 = external input for alarm or protection or disconnection
Power factor setting range (cosϕ)	0.70 inductive (lagging) to 0.70 capacitive (leading)
Starting current (C/k setting)	0.01 to 5A with automatic measurement of C/k ratio
Switching sequences	1 = 1:1:1:1:1 …, 2 = 1:2:2:2:2 …, 4 = 1:2:4:4:4 …, 8 = 1:2:4:8:8 …, and so on Please refer RVT user manual for further details of the options.
Communication	Ethernet 10/100BASE-T, USB2.0 and RS485
USB connection	Host connection not enabled but device access available
Modbus baud rates	300, 600, 1200, 2400, 4800, 9600, 19200, 38400 or 57600 bps
CAN connection	CAN 2.0B interface
Step configuration	Automatic, fixed or disabled
Display	QVGA 320x240 pixels, colour touchscreen, backlit
Switching delay between steps	Programmable from 01 seconds to 18 hours
Memory	All programmed parameters and modes saved to non-volatile memory
Operating temperature	From -20°C to 70°C
Storage temperature	From -30°C to 85°C
Mounting	Door/panel mounted
Dimensions	Front-face (visible) = 146H x 146W (mm) Rear (inside the door) = 135H x 205W (mm) Overall dimensions = 146H x 211W x 67D (mm) Door/panel cutout = 138H x 138W (mm)
Weight	650 grams (unpacked)
Terminals/connectors	Spring-type cage-clamp (for 2.5mm² single-core cable)
Ingress protection	IP43 on door-front only (Nema12 or Nema3R supplied where applicable)
Relative humidity	Max. 95% non-condensing
Approvals	CE and CSA/UL approvals

Features and connection types by model
RVT-6TS and RVT-12TS-3P

Features by Model	RVT-6TS	RVT-12TS-3P
Factory order code	2GCA291720A0050	2GCA291722A0050
Measurement points	1 voltage measurement 1 current measurement (single CT input)	3 voltage measurements 3 current measurements (Either 1 or 3 CT input) Suitable for 1-ph and 3-ph
Real-time clock	No	Yes
Energy measurements	No	Yes
Ethernet connection	No	Yes
USB host connection	No	Yes
USB device connection	Yes	Yes
Digital inputs	Yes	Yes
Alarm relays	Yes	Yes
Fan relays	Yes	Yes
Output relays	6	12
Lock switch	Yes	Yes
RS485 Modbus	Yes	Yes
External temperature	Yes	Yes

Connection topologies
Connection types are defined by the number and type of CT and VT used. Various options are listed on this and the opposite page.

Additionally, up to 8 temp. probes (shown below) may be daisy-chained to the RVT which will close the fan relay if any one of the eight temperature thresholds are crossed, and this is also saved by the event logging function.

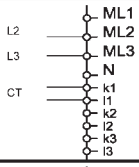
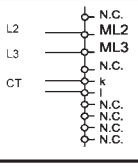
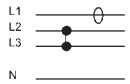
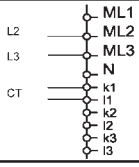
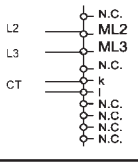
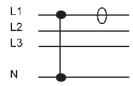
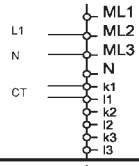
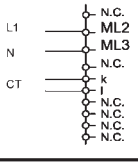
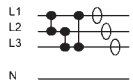
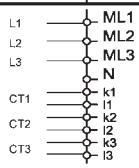
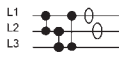
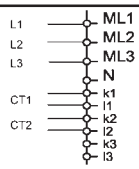
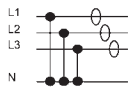
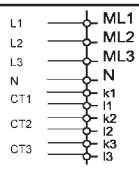
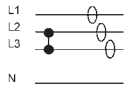
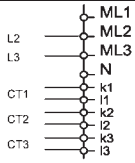
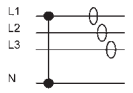
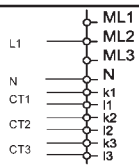


Connection Type	RVT-6TS	RVT-12TS-3P
Type1	1Ph-1LL1	1Ph-1LL1
Type2	3Ph-1LL1	3Ph-1LL1
Type3	3Ph-1LN1	3Ph-1LN1
Type4	n/a	3Ph-3LL3
Type5	n/a	3Ph-3LL2
Type6	n/a	3Ph-3LN3
Type7	n/a	3Ph-1LL3
Type8	n/a	3Ph-1LN3

Parameter to be set	Manual commissioning	Automatic commissioning
1-ph/3-ph CT & Voltage connection type	To be manually set	To be manually set
Phase rotation only	To be manually set	Automatic setting
CT ratio before phase shift	To be manually set	To be manually set
CT redirection	To be manually set	Automatic setting
Phase shift	To be manually set	Automatic setting
PT ratio (for MV banks only)	To be manually set	To be manually set
V nominal	To be manually set	To be manually set
ON delay	To be manually set	Automatic setting
OFF delay	To be manually set	Automatic setting
Output status and size	To be manually set	Automatic setting
Qstep (minimal step size)	To be manually set	Automatic setting
C/k (start current)	To be manually set	Automatic setting
Target power factor (cosϕ)	To be manually set	To be manually set

Note:
Prior to commissioning (both auto or manual), please ensure that:
– RVT is unlocked (both software and hardware)
– RVT is in SET mode
– CTs are properly connected and with the correct polarity

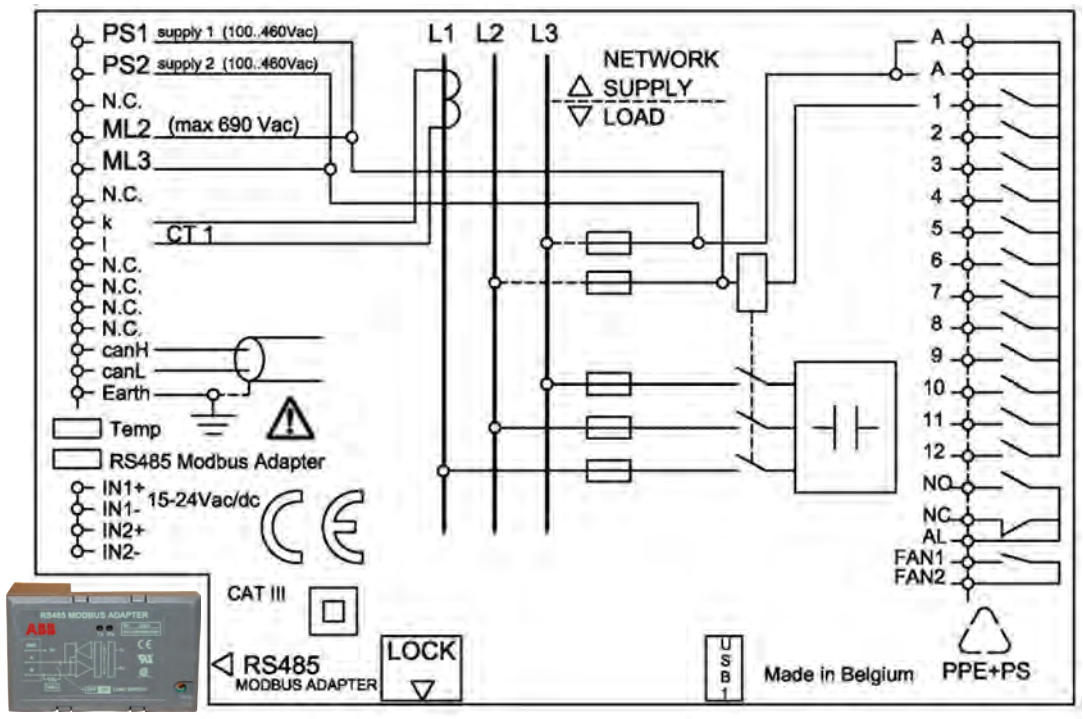
Connection types
1-phase and 3-phase control

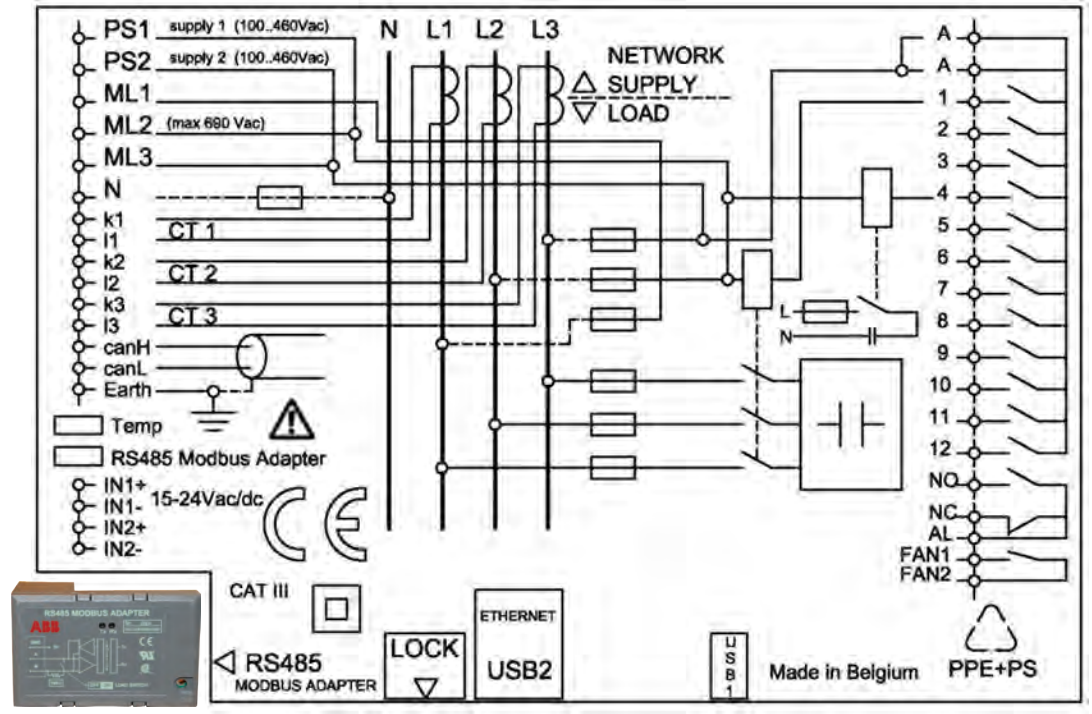
Connection type		RVT 12 - 3P	RVT 6 / RVT 12	Phase shift	Voltages						Currents				Compensation type		
Name	Schematics	Connection	Connection	adjustment	L12	L23	L31	L1N	L2N	L3N	L1	L2	L3	N	Full C3[1]	Full C1[2]	Mixed C3+C1
1Ph-1LL1				0° by default (see phase shift table)	-	Measured	-	-	-	-	Measured	-	-	-	-	yes	-
3Ph-1LL1				90° by default (see phase shift table)	-	Measured	-	-	-	-	Measured	-	-	-	yes	-	-
3Ph-1LN1				0° by default (see phase shift table)	-	-	-	Measured	-	-	Measured	-	-	-	yes	-	-
3Ph-3LL3			-	0° by default (Adjust - phase rotation - CT redirection)	Measured	Measured	Measured	Calculated	Calculated	Calculated	Measured	Measured	Measured	Calculated	yes	yes	yes
3Ph-3LL2			-	0° by default (Adjust - phase rotation - CT redirection)	Measured	Measured	Measured	Calculated	Calculated	Calculated	Measured	Measured	Calculated	(3)	yes	yes	yes
3Ph-3LN3			-	0° by default (Adjust - phase rotation - CT redirection)	Calculated	Calculated	Calculated	Measured	Measured	Measured	Measured	Measured	Measured	Calculated	yes	yes	yes
3Ph-1LL3			-	0° by default (Adjust - CT redirection)	-	Measured	-	-	-	-	Measured	Measured	Measured	Calculated	yes	yes	yes
3Ph-1LN3			-	0° by default (Adjust - CT redirection)	-	-	-	Measured	-	-	Measured	Measured	Measured	Calculated	yes	yes	yes

[1] C3: three-phase capacitor control
[2] C1: single-phase capacitor control

Wiring diagram

RVT6 with 1x CT and RVT12-3P with 3x CTs





Legend:

PS1/2 = power supply to device

ML1/2/3 = voltage sensing inputs

N = neutral

k1/2/3 and I1/2/3 = CT inputs

canH/L = CAN bus

Earth = Earth

Temp = input for temperature probe

RS485 = RS485 adapter and port

IN1/2 = digital inputs (+ and -)

A = common for output relays

1 to 12: relay outputs

NO/NC = alarm output contacts

AL = common for alarm relay

FAN1/2 = Fan output relay

USB = USB connection

RJ45 = Ethernet

LOCK = device hardware lock

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