Communication

Communication with the convertor control equipment is possible via the operator's panel, via I/O-units for discrete signals or with serial communication from other computer equipment.

I/O-system

Basic I/O-board YPQ202

External signals are connected to the basic I/O-board YPQ202 via individually disconnectable terminal blocks, accepting up to 2.5 sqmm (AWG14) wires. Following functions are included:

- Three digital output and four digital input channels with fixed functions, for fan, field and main contactor operation. These circuits are connected to the 110 V a.c. control voltage.
- Eight digital input channels, user defined function.
- Five digital output channels, user defined function.
- Four analogue input channels, user defined function. The input signal can be ± 1 V, ± 10 V or 4 - 20 mA.
- Two analogue output channels, user defined function.
- One analogue output for current actual value (buffer amplifier on current feedback signal).
- One analogue output for speed actual value (buffer amplifier on analogue tacho feedback signal).
- Pulse generator input.
  The unit has three inputs, two measurement channels to detect forward/reverse rotation and one 0-pulse input. One of the standard digital input channels can be programmed to give a synchronization pulse in positioning applications. The maximum pulse frequency is 50 kHz.
- Modem for service unit RS422.
  The service unit can be connected while the equipment is in operation. Information is transmitted from the convertor to the service unit, where it can be displayed on the operator's panel and/or printed out.

The setting of user defined input/output channels is performed from the service unit/operator's panel i.e. no service terminal/PC is required.

Expansion I/O units (CD 26-29)

The control equipment is prepared for four expansion I/O-units.
Note: Expansion I/O-units require a corresponding software function in the control program.

Each expansion unit consists of two circuit boards and an interconnecting ribbon cable. One board is plugged on to the computer board on the convertor module. The other board accommodates the customer connection terminals, and is placed outside the convertor module for convenient connection of wires.

Following expansion units are available:

- Digital input unit (YPI103 + YPI104).
  Eight channels, adapted for 110 V a.c./d.c. supply.
- Digital output unit (YPO105 + YPO106).
  Eight channels, galvanically free relay contacts.
- Analogue input unit (YPG110 + YPG106).
  Four channels and a voltage divider for analog tachometer signal, a current generator for Pt100 supply and a reference voltage source ±10 V.
- Analogue output unit. (YPM102 + YPM105)
  Four channels.

Analog input channels
Basic I/O (AI37XX) (CD 24)
Expansion I/O (AI33XX) (CD 28)

Analog input channels are normally used for external references, armature voltage feedback, temperature measurement and tachometer generator input.

Both current and voltage signals can be connected to the analog inputs. The reference type and level for each of the four channels is selected with parameter AI37MODE/AI33MODE as shown in the circuit diagram. The strapping arrays S1-S4 must be changed accordingly.

With a voltage reference with signal level ±1 V or ±10 V, either a differential or a bipolar input can be chosen.

Differential input: Neither strap 1 - 2 nor 3 - 4.
Bipolar input: Insert strap 3 - 4.

With a current reference signal 4 - 20 mA, insert strap 1 - 2. This will permit the passage of current through the 500 ohm resistor.
The input value on channel 2 and 3 can be multiplied from -16 to +16 times, using parameter AI37.2MU/AI33.2MU or AI37.3MU/AI33.3MU. The parameters are on delivery set to 1.000.

On the basic I/O-board, the filter time constant can be individually chosen for each channel from 3 to 40 ms set by strapping arrays S5 - S8.

On the expansion I/O-unit the filter time constant can be chosen 10 ms or 25 ms, strapping arrays S5 - S6.

The analog input channel must be adapted to the signal type and level connected, for example:

D.c. voltage transducer: 10 V
Convertor temperature monitor, convertors 40 - 530 A: 1V
Convertor temperature monitor convertors 640 - 3600 A: 10 V

An analog tachometer generator is connected to the voltage divider, voltage level chosen by jumpers A - D as shown in the circuit diagram. By inserting strap S9:1 - 2/S5:1 - 2, the signal is connected to one of the analog input channels.

On delivery, the 4 channels on the expansion analog input board are zero-balanced. If however it should be necessary during commissioning, channel 1 is zero-balanced with R58, 2 with R57, 3 with R60 and channel 4 with R59.

Analog output channels
Basic I/O (AO37XX) (CD 23)
Expansion I/O (AO34XX) (CD 29)

The analog output channels on the basic I/O-board give ±10 V output. On the expansion unit the signal level can be set for either 0 - +10 V or -10 V - +10 V. using parameter AO34MODE.

Two of the output signals can be multiplied up to 256 times, using parameters AO37.1MU/AO34.1MU and AO37.2MU/AO34.2MU. The signals can also be offset by ±100 % using parameters AO37.1OF/AO34.1OF and AO37.2OF/AO34.2OF.

Digital input channels
Basic I/O (DI37XX) (CD 22)
Expansion I/O (DI31XX) (CD 26)

The input resistors are on delivery designed for 110V a.c. or d.c. signals, but other voltages may be used if the input resistors are changed accordingly.

Basic

Voltage	24 V	48 V	110 V	220 V
Resistor 5W	2.2 kΩ	4.7 kΩ	10 kΩ	22 kΩ

Expansion

Voltage	24 V	48 V	110 V	220 V
Resistor 5W	470 Ω	4.7 kΩ	12 kΩ	27 kΩ

All input signals are operated individually. The signal to which the channel is connected is found in function module CONNECT1 and can be displayed on the operator's panel. The input signals can be individually inversed, using parameters DI37INV/DI31INV. Active signal is indicated by a yellow LED.

Digital output channels
Basic I/O (DO37XX) (CD 22)
Expansion I/O (DO32XX) (CD 27)

All output signals are operated individually. Each channel is provided with a galvanically free relay contact. The output signals can be individually inversed, using parameters DO37INV/DO32INV as shown in the circuit diagram. The parameters are on delivery set to 0.

Signals connected to the output channels can be displayed on the operator's panel, and are found in the function modules from which they derive.

I/O channel data

Digital input

Basic I/O unit:	12 channels
Expansion I/O unit:	8 channels

Isolation by opto-coupler.
Input load resistor on soldering posts.

Resistor value:	10 kΩ, 5 W
Nominal input voltage:	110 V a.c./d.c.
Min. voltage for "1":	90 V
Max. voltage for "0":	11 V
Max. input voltage:	140 V
Filter time constant:	2.4 ms/10 ms

Digital output

Basic I/O unit:	8 channels
Expansion I/O unit:	8 channels

Isolation by relay.

Max. voltage:	250 V a.c./d.c.
Continuous current:	3 A

Relay contact data.

Min. voltage and current:	5 V, 1 mA
Lim. making capacity:	30 A, 200 ms
Lim. breaking capacity a.c.:	8 A, 250 V, $\cos\Phi_t >= 0.4$
Lim. breaking capacity d.c.:	1.2 A, 48 V
	0.3 A, 125 V
	0.2 A, 220 V

Analog input

Basic I/O unit:	4 channels
Expansion I/O unit:	4 channels

Input type:	Differential ampl.
Max. common mode volt.:	±100 V
Input voltage:	±10 V, 5 mA
Current loop:	5 mA
Resolution:	12 bits
Linearity error:	±0.5 LSB

Analog output

Basic I/O unit:	2 channels
Expansion I/O unit:	4 channels

Output:	±10 V, 5 mA
Resolution, basic I/O:	12 bits
Resolution, exp. I/O:	8 bits
Linearity error, basic I/O:	±0.5 LSB

Digital speed measuring

Max. input frequency:	50 kHz
Input signal:	12 V, 24 V, 13 mA
Pulse gen. power supply:	24 V

Serial communication for service unit, OPC

RS 422 interface

Max. cable length:	100 m

High speed serial bus

The communication unit, YPK107 (unit 41) has two channels. One channel is used for communication with an ABB Master, the other channel can be utilized for Master/Follower communication between drives.

One modem board, YPC104, per channel is mounted on top of the communication board, unit 41.1 for Master communicaiton, unit 41.2 for master/follower communication.

The ABB Master communication link can address up to sixteen convertors in a multidrop configuration. The convertors are connected together with coaxial cable. The cycle time is 1 ms per drive connected, and the transmission speed is 2 Mbit/s.

The master/follower communication link can handle up to eight followers connected to one master drive. The cycle time is 1 ms per follower connected.

The unit is provided with a communication circuit of DUSCC (Dual Universal Serial Communication Control type), a double port memory, a 16 bits processor which reads and writes in this memory and a DMA (Direct Memory Access) circuit. The communication is half duplex in accordance with the specification for the Master Field Bus (modified SDCC protocol). The transmission code used is NRZI.