Technical data

Inverter Type: Yaskawa V1000-series

Type	Input			Output			
	Power	Fuse	Voltage	Current	I max für 60s	Power	Losses
CIMR-VC	in kVA	in A	in V	in A	in A	in kW	in W
40001BAA	0,9	6	400	1,2	1,8	0,18	19,6
40002BAA	1,4	6	400	1,8	2,7	0,37	32,4
40004BAA	2,6	10	400	3,4	5,1	0,75	47,3
40005BAA	3,7	10	400	4,8	7,2	1,50	66,3
40007BAA	4,2	16	400	5,5	8,3	2,20	86,9
40009BAA	5,5	20	400	7,2	10,8	3,00	95,1
40011BAA	7,0	25	400	8,2	12,3	4,00	127,7
40018BAA	11,3	36	400	14,8	22,2	5,50	261,3
40023BAA	13,7	36	400	18,0	27,0	7,50	321,1
40031BAA	18,3	50	400	24,0	36,5	11,00	433,6
40038BAA	23,6	63	400	31,0	46,5	15,00	475,0

	Weight	Dimensions	EMC-Filter	
			Name	Dimensions
CIMR-VC	in kg	B x H x T (mm)		WxHxD (mm)
40001BAA	1,2	108x150x 81	**FS-23639-5-07	111x169x45
40002BAA	1,4	108x150x 99	**FS-23639-5-07	111x169x45
40004BAA	1,9	108x150x138	**FS-23639-5-07	111x169x45
40005BAA	1,9	108x150x154	**FS-23639-10-07	111x169x45
40007BAA	1,9	108x150x154	**FS-23639-10-07	111x169x45
40009BAA	1,9	108x150x154	**FS-23639-10-07	111x169x45
40011BAA	1,9	140x153x143	**FS-23639-15-07	144x174x50
40018BAA	2,6	140x254x140	**FS-23639-30-07	137x304x56
40023BAA	3,8	140x254x140	**FS-23639-30-07	137x304x56
40031BAA	5,2	180x290x143	**FS-23639-50-07	175x340x65
40038BAA	5,5	180x290x163	**FS-23639-50-07	175x340x65
			** Foot-Print-Filter	

Caution: The max. current of the compressor should be less than the rated current of the inverter.

General technical data:

	Name	Specification:
Input	Input voltage Line frequency	3-Phase 400V -15% to +10% 50/60Hz +/- 5%
Output	Output frequency Overload capacity	0,01 to 400Hz Default settiing: 30-60Hz 150% for 60s (HD)
Environment	Ambient temperature Huminity Storage temperature Altitude Vibration	-10°C to 50°C < 95%, non condensating -20°C to 60°C Max. 1000m Output de-rating >1000m 1% per 100m max. 3000m max. 5,9m/s²
Misc.	Safety standards IP - rate	UL508C; EN954-1 Kat.3 IEC/EN61508 SIL2 IP20

Variable Speed Drives YASKAWA V1000 - series

Short manual:
V1000 with Software for speed control of compressors with integrated compound controller

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L1 Standard refrigeration parameter

Para-meter Number: | Range min. max. | Default Setting Value: | Change during operation | Parameter-description

Sensor lower level

P1-01	-99	100	-0.8	N

Sensor upper level

P1-02	-99	100	7.0	N

The parameter P1-01 and P1-02 determine together the range of the pressure transducer. These settings are the reference to show the system pressure in real values in the display.
Only transducers with the following specification can be used:
Voltage range: 8 to 30V/DC
Pressure range: -0,8 to 7,0 Bar.
Other values on demand.

Pressure reference setpoint in Bar

P1-03	-99	100	1.0	Y

This parameter determines the setpoint for suction pressure in the system.

AUTO-OFF Pressure in Bar

P1-04	-50	100	0.5	Y

AUTO-OFF Pressure time in sec

P1-05	0.0	300!	0.0	N

Once the pressure level in the system is underneath the value in parameter P1-04 for the time set in parameter P1-05 the drive will switch automatically OFF.
Example:
According to factory settings the pressure must be for 10.0s below 1,5 Bar, then the drive is switching itself off.

AUTO-ON Pressure (Hysteresis)

P1-06	0.0	40.0	1.0	N

AUOT-ON Pressure time in sec

P1-07	0.0	300!	20	N

Once the pressure exceeds the value set in P1-06 + P1-04 for the time set in parameter P1-07 the inverter will automatically switch on again.
Example:
P1-04 = 1,5Bar; P1-06 = 1,0Bar
ON Pressure: 1,5Bar + 1,0Bar = 2,5Bar

2. reference via digital input

P1-08	-20	+20	0	N

Once a digital input has been set to mode "80" the pressure reference will change in accordance to the setting in case this input becomes active. Example: P1-03 = 3,0 Bar
P1-08 = -2,0 Bar --> New reference: 1,0 Bar.

Display of the system pressure

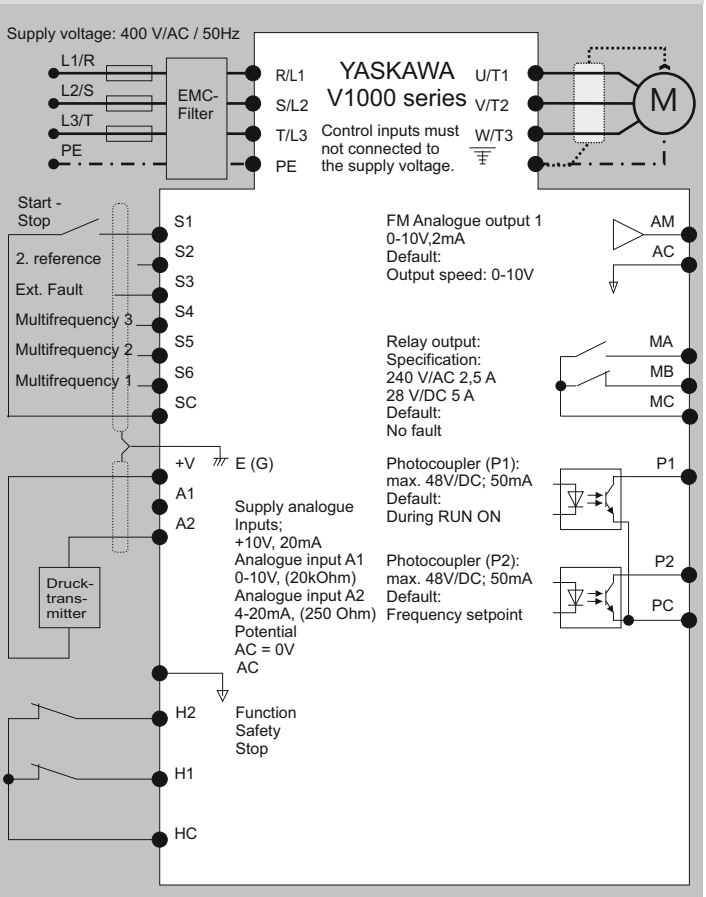
U1-03	-99	100	8.8	N

Shows the system pressure and will be scaled in parameter P1-01 and P1-02

U7-02 Pressure reference (P1-03)
U7-03 System pressure

L1 Standard refrigeration parameter

R1 Standard-wiring



Caution:
All default settings are based on a pressure transducer with the following specification:
Voltage range: 8-30V/DC; Signal: 4-20mA; Range: -0,8 to 7,0 Bar

R1 Standard-Wiring

Skip output frequencies R8

Resonance frequency 1

d3-01	0.0	400	0.0	N

Resonance frequency 2

d3-02	0.0	400	0.0	N

Resonance frequency 3

d3-03	0.0	400	0.0	N

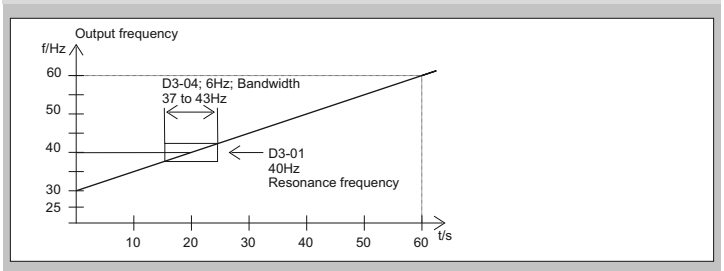
In order to avoid continous operation at a speed that causes resonance in driven machinary, the V1000 can be programmed with 3 separate skip frequencies. This will not allow continued operation within specific frequency ranges. If the speed reference falls within a skip frequency dead band, the V1000 will clamp the frequency reference just below the dead band and only accelerate once the reference rises above the upper end of the dead band.
The following conditions must be fullfilled:
d3 - 01 > d3 - 02 > d3 -03

Band width resonance frequency

d3-04	0.0	20.0	1.0	N

Is needed to set the band width of the resonance frequency in Hz.
Example: Resonance requency = 20Hz
Bandwidth: 8Hz
The skip frequency range is now between 16,0 and 24,0Hz.

Example for a skip frequency R8.1



Skip output frequencies R8

R7 Autotuning, Safety-, EMC-recommendations

The autotuning - function will measure and adjust alle required motor data automatically. It is recommended to use the autotuning function with every new commissioning. If it is not possible to open the coupling the function “Autotuning with no rotate” should be choosen. Non correct settings will interrupt the autotuning process, respectivley the motor will not run as smoothly.

Para-meter Number: | Range min. max. | Default Settings Value: | Change during operation | Parameter-Description

Autotuning Mode — P1-01 | 0 | 2 | 0 | N

0=Rotating Autotuning (Vector-controlled)
1=Stationary Autotuning (Vector controlled)
2=Stationary Autotuning for line to line resistance. (Recommended)
Choose mode and follow the menu.

Motor rated power — P1-02 | 0 | 99.9 | 0 | N

Setup of the nameplate motor power in kW. This parameter generates the basis data to start with the autotuning function. Default values are depending on the inverter size.

Motor rated voltage — P1-03 | 0 | 510 | 400 | N

The motor rated voltage is needed to adjust the V/Hz curve. Example:
Motor 230/400V Delta
E1-13 = 230V; E1-06 = 50Hz; E1-04 = 87Hz.
E1-06 = Motor rated frequency.

Motor rated current — P1-04 | 0 | 99.9 | 0 | N

With the setting of the motor rated current the V1000 could calculate a thermal model of the connected motor.This will prevend the motor to get overlaoded (Fault: OL1)

Base frequency — P1-05 | 0 | 150 | 50.0 | N

The base frequency of the motor determines the nameplate frequency of the connected motor.

Number of motor poles — P1-06 | 2 | 48 | 4 | N

The number of motor poles is used to input data for the autotuning function.

Motor rated speedl — P1-07 | 0 | 240 | 175 | N

The rated motor speed is used as input data for the autotuning function.

Press “RUN” key

RUN START >>>>> GOAL

Text message after successful autotuning: “Tuning successful”
Repeat procedure once autotuning was interrupted with fault message.

R7.1 Safety and EMC - recommendations

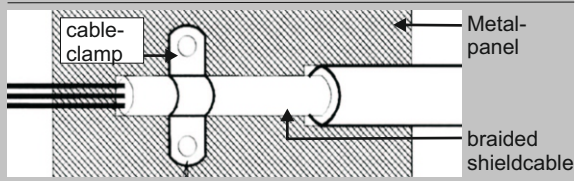
Operation
The operation of the drive must be in accordance the safetey regulations of the manual SIEPC710606 19A page 12. Commissioning and maintenance is only allowed throughout qualified and trained personal.

Power Off
After power Off the DC-bus voltage may remain up to 5 further minutes. Therefore before opening or serviceing it is required to measure the DC-bus voltage to confirm a safe level.

Product-norms
All devices were tested through authorized institutions and are in accordance with the following standards:
- EN61800-3:1996
- EN61800-3; A11:2000
All drives of the V1000 series are certified with: CE, UL, c-UL.

EMC-filter
For legal reasons it is required to meet the EMC standards. Therefore the EMC filters listed at page R2 must be used. If the EMC filters are correctly installed the drive will meet class “B” of the EN 55011. All filters are designed as footprint filters to be mounted underneath the V1000 series.

Motor cable (max. 50m)
It is highly recommended to use braided shield cables. The cable shield must be grounded on both sides. Wiring should be done as short as possible.



Control wiring (max. 50m)
All control cables should be shielded and must not be used together with power cables.

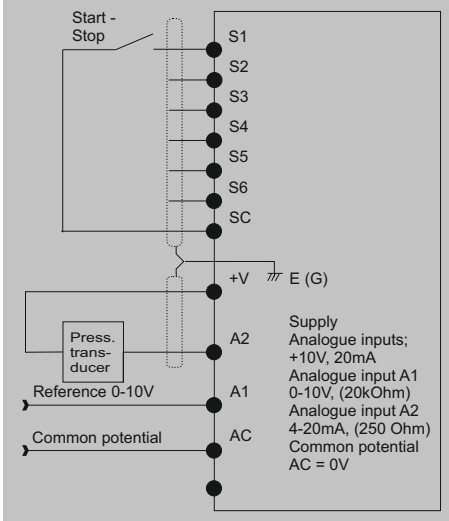
RCD Devices
The use of a standard earth leakage breaker (RCD) may not work, the breaker might trip before or not proper. It is highly recommended to choose a breaker specially designed for variable speed drives.
E.g.: RCD Typ B bfq (Suitable for variable speed drives)

References via terminals L2

Para-meter Number: | Range min. max. | Default Setting Value: | Change during operation | Parameter-description

Reference via terminals — P1-09 | 0 | 2 | 0 | N

With short circuiting the terminals in accordance with the following chart the reference can be modified:
Mode: 0 Reference = P1-03;
1 Reference = A1; 2 Reference = terminals



Caution:
All settings are based on a pressure transducer with the following specification:
Voltage Range:
8-30V/DC; Signal: 4-20mA
Range: -0,8 to 7,0 Bar

Parameter: P1-09=1
Reference via A1
In case of a 0-10V Signal this will be automatically chosen for a reference with the following range:
Reference: 0V = -0,8Bar
Reference: 10V= 7,0Bar

Assign A1 as reference source — h3-02 | 0 | 31 | 20 | N

Through this setting analogue input A1 is determined to be the refence by an external 0-10V.

Low Pressure Bypass at Start L2.1

Low pressure off level at “Start” — P1-10 | -50 | 50 | 15 | Y

At every start of the compressor the low pressure switch OFF level will be reduced for the time set in parameter P1-11.

Low pressure time at “Start” — P1-11 | 0 | 300 | 0 | N

Determines the time were the low pressure OFF level at start is active.
This function is not acive once the value will be set to “0” in the parameter.

Behaviour on power ON L2.2

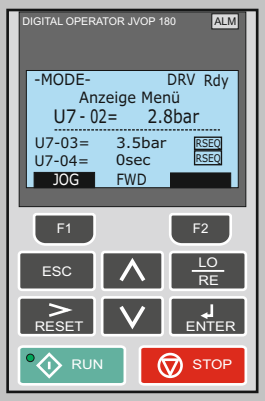
Behaviour on power ON — P1-12 | 0 | 3 | 3 | N

Determines the reaction of the drive on power on of the V1000:
Mode 0:
Low pressure function not actice
Mode 1:
Start without delay
Mode 2:
Start with delayaccording to P1-07
Mode 3:
Start depending on the pressure at P1-04

Display indication after Power ON L2.3

With standard LED display

With optional LCD text display



Remark:
Operation and Programming example at page L7

L3.1 Compound Controller

Para-meter Number: | Range min. max. | Default Settings Value: | Change during operation | Parameter-description

Frequency 2nd compressor ON — P2-01 | 0 | 400 | 58.0 | N

Once the output frequency has exceeded the value set in this parameter for the time set in parameter P2-03 the V1000 will activate a digital output. Normally this parameter is set to max. otput speed. In cases with compressors of different sizes this function can be used to adjust the compound controller.

Time 2nd compressor ON — P2-02 | 0 | 3000 | 10.0 | N

Switch OFF level 2nd compressor — P2-03 | 0 | 400 | 3.0 | N

Once the feedback value is below the value set in this parameter for the time set in parameter P2-04 the V1000 will de-activate the output for the 2nd compressor. Beforehand the relevant digital output needs to be configured in Mode "40".
Output MA/MB/MC: H2-01 Mode 40
Output P1/PC: H2-02
Output P2/PC: H2-03

Time 2nd compressor OFF — P2-04 | 0 | 3000 | 10.0 | N

Max. starts/h — P2-05 | 0 | 25 | 8 | N

Normally the amount of starts per hour is limited due to a possible thermal overloadin case compressors are started direct on line (DOL). This parameter prevents the 2nd compressor. "0" '= OFF

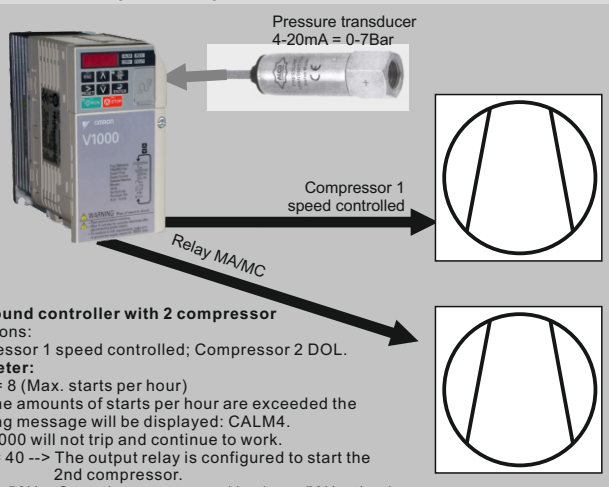
Compound counter — U7-04 | 0 | 300 | 10.0 | N

Once the conditions to switch the 2nd compressor ON or OFF are reached a down counter occurs in the display indicating the remaining time to switch ON or OFF in seconds.

Compound mode for digital output — h2-01 | 0 | 192 | 40 | N

Once a digital output is foreseen to activate the 2nd compressor the relevant output must be configured in mode "40".
h2-01 --> MA/MC; (Relay)h2-02 --> P1/PC;
h2-03 --> P2-P2 (opto couplers)

L3.2 Example compound controller



Compound controller with 2 compressor
Conditions:
Compressor 1 speed controlled; Compressor 2 DOL.
Parameter:
P2-05 = 8 (Max. starts per hour)
Once the amounts of starts per hour are exceeded the following message will be displayed: CALM4.
The V1000 will not trip and continue to work.
h2-01 = 40 --> The output relay is configured to start the 2nd compressor.
P2-01 = 58Hz; Once the output speed is above 58Hz, the timer in P2-02 starts.
P2-02 = 30s; Time to switch on the 2nd compressor

U7-04 = Shows the remaining time in seconds once timer P2-02 began to run.
P2-03 = 2,5 Bar; Once the pressure is below this value, the timer in P2-04 starts.
P2-04 = 10s; Time to switch OFF the 2nd compressor

U7-04 = Shows the remaining time in seconds once the timer P2-04 began to run.

L3.3 Counter compound controller

Pending on the settings of parameter h2-01 (Mode output relay MA/MB/MC) this counter shows the remaining time to activate or de-activate the output relay.
The following modes are possible:
40 --> Counter 2nd compressor ON/OFF
41 --> Counter Oil recover function
42 --> Counter Oil heating function
43 --> Counter power control

Example:
P1-03 1,0Bar; Reference
P2-01 58,0Hz; Frequency to switch ON 2nd compressor.
P2-02 90 s; Once the output frequency exceeds 58Hz the counter P2-02 will start.
This will be indicated in the display.
The counter will be reset if the output speed will come down again within this 90s.
The output relay will be active once the counter has reached 0.

This eases the commissioning of the compound controller.

L3 Compound controller

Fault memory R6

Fault:	Description	Cause / *Action*
GF	Ground fault	Current shorted to ground exceeded 50% motor current. ***Test of the V1000 without motor connected*** ***Check motor insulation***
OC	Overcurrent	Output current of the V1000 is too high. ***Test with motor disconnected, Check motor insulation*** ***Eventually increese acceleration time in C1-01.***
LF2	Current Imbalance	Output current imbalance. ***One motor phase at the output is missing, check wiring of the connected motor.***
ov	Über-spannung	The DC-bus voltage has reached a value of 820V/DC. ***Increase the deceleration ramp rate.*** ***Check supply voltage (< 480V/AC +10%)***
Uv1	DC-Bus too low	The DC-bus voltage is below 380V/DC. ***Check supply voltage and connections (> 350V/AC)***
Uv2	Controlvolt. too low	The control voltage has reached a critical level. ***Check control terminals on short circuits or high consumption; Switch OFF and ON***
Uv3	Soft charge circuitry	Fault while DC-bus capacitors were soft charged. ***Power OF and ON again, if problem still exist unit needs to be replaced.***
PF	Input Phase loss	Ripple in the DC-bus too high (only if L8-05=1) ***Check supply voltage***
LF	Output phase loss	Phase loss at the output (only if L8.07 = 1) Cable break at the motor cables, underload ***Check motor power and cabling***
oh	Over temperature	The heatsink temperature has exceeded 105°C. ***Check drive fan, ambient temperature and dust filter.***
oL1	Motor overload	Motor overload due to the thermal model of the V1000 which has calculated an overload, ramp rates too short ***Check* motor rated current in *E2-01*** ***V/Hz curve in E1-02*** ***Check acceleration ramp rate in C1-01 evtl. too short*** ***Check deceleration ramp rate in C1-02 evtl. too short***
oL2	V1000 overload	Variable speed drive overloaded Load too high, Ramp rates too short ***Check rated current in E2-01*** ***V/Hz curve in E1-02*** ***Check acceleration ramp rate in C1-01 evtl. too short*** ***Check deceleration ramp rate in C1-02 evtl. too short***
uL3	V1000 underload	Torque below setting (only if L6-01 = 7 or 8) Belt monitoring ***Check mechanical setup***
FbL	PID feedback loss	PID-feedback loss (only if B5-12 = 2) **Check pressure transducer**
EF3	External Fault 3	External fault at digital input S3 EF4 = S4; EF5 = S5; EF6 = S6; EF7 = S7 ***Check control wiring and find what has caused this.***
CPF--	CPF XX Fault	Control board failure ***Power OF and ON again, if problem still exist unit needs to be replaced.***

Alarm messages R6.1

Alarms shall protect the V1000 and do not cause tripping of the inverter. During alarm the display is blinking. After fixing the problem which has caused the alarm the V1000 returns automatically back to the status which was in case before the alarm.

Failures Refrigeration Software IV R6.2

ESC1	„Emergency" Run	In case of a problem with the power module of the V1000 it might be possible to control the compound compressor.
FbLSt	Feedback lost	Display indication in case the signal from the pressure transducer gets lost. The V1000 will run with the frequency of P3-04, if B5-12 is set to „2" it will trip.
MAin	Maintenance required	Determines the maintenance intervall. Once the hours set in this parameter will exceed it will display this message , however it will not trip, it is only an alarm (see page L4)
CO-nP	Compressor Starts/h high	In case the amount of start/h will exceed the value in parameter P2-05 it will display this message. After it reaches again a safe time, this message will disappear.

Programming failures (OPE) R6.3

OPE01	kVA failure	Failure V1000 sizing on parameter 02-04 ***Check input data of parameter O2-04 via display.***
OPE02	Range exceeded	Failure V1000 sizing on parameter 02-04 ***Check input data of parameter O2-04 via display.***
OPE03	Double Input	Some of the digital inputs were programmed with the same function or mode. ***Ceck digital inputs.***

Autotuning Faults (Er) R6.4

Er-01	Motor data fault	Failure data input, difference between motor power setting and motor current adjustment. ***Check motor data***
Er-02	Alarm	Fault during autotuning. ***Check motor data, wiring and load, repeat autotuning***

Failure copy function of the display R6.5

PrE	Write protection	Failure write/read function from/to the display. Protection mode still active. ***Change Parameter 03-02 = Mode 1***
dAE	Wrong device	Drive data are not correct. ***Ceck data in parameter o2-04.***

Caution: These messages are selected from the manual and are not complete.
Manual: YEG-SIEP C7 10606 19a

Fault memory R6

R5 Monitor screens U1-XX

Mode:	Description	Function:
U1-01	Frequency reference	Shows the value of the frequency reference. This reference is not used in the refrigeration software. Min. unit: 0,01 Hz
U1-02	Output frequency	Shows the current output frequency. Min. Unit: 0,01 Hz
U1-03	Output current	Shows the output current. Unit: 0,01 A
U1-06	Output voltage	Shows the momentary output voltage Min. Unit: 0,1 V
U1-07	DC-Bus voltage	Shows the DC-Bus voltage UDC/√2=Input or supply voltage 565V/DC / 1,414 = 400V Uin
U1-08	Output power	Shows the putput power in kW. Min. Unit: 0,1 KW
U1-10	Input terminals status	U1-10 = S6 S5 S4 S3 S2 S1 Example see left side: Terminals S1 and S4 = Signal Rest = no Signal
U1-11	Output terminals Status	U1-11 = n. used P2 P1 MA PCPCMC Example see left side: Relay MA/MC = active P1/PC and P2/PC = not active
U1-13	Level terminal A1	Shows the input level at analogue input A1. 0% --> 0V or -10V (according to h3-01) 100% --> 10V
U1-14	Level terminal A2	Shows the input level at analogue input A2. 0% --> 0V; -10V or 4 mA (according to h3-08) 100% --> +10V or 20mA

R5.1 Fault monitoring U2-XX

U2-01	Actual fault	Shows the failure code of the actual fault. Failure code according to table R9 No fault = NONE
U2-02	Last fault	Shows the failure code of the last fault. Failure code according to table R9 No fault = "NONE"
U2-03	Reference at last fault	Shows the reference speed while the drive was tripping last time.
U2-04	Output frequency at last fault	Shows the output speed while the drive was tripping last time.
U2-05	Output current at last fault	Shows the output current while the drive was tripping last time.
U2-08	DC-Bus voltage at last fault	Shows the DC-Bus voltage while the drive was tripping last time.
U2-11	Status Input terminals	U1-10 = S7 S6 S5 S4 S3 S2 S1 Shows the status of the input terminals while the drive was tripping last time.
U2-14	Running time at last fault	Shows the running time while the drive was tripping last time.

R5.2 Fault history U3-XX

U3-01	Failure code last fault	U3-02 failure code 2nd most recent fault U3-03 failure code 3rd most recent fault U3-XX .....
U3-09	Failure code 9th most recent fault	U3-09 failure code 9th most recent fault U3-10 Operation time last fault U3-11 Operation time 2nd most recent fault
U3-11	Operation time last fault	U3-12 Operation time 3rd most recent fault U3-XX ..... U3-20 Operation time 9th most recent fault
U3-20	Operation time 9th most recent fault	

Important:
The following failure codes will be not monitored in the fault history screens:
CPF00 Fault display communication
CPF01 Fault display communication
CPF03 EEPROM failure
UV1 Low voltage fault
UV2 Low voltage control supply

R5.3 Maintenance Monitor U4-XX

U4-01	Accumulated operation time	Shows the total operation time of the drive and can be reset with parameter o4-01.
U4-02	Number of RUN commands	Displays the number of times the RUN command has been entered and can be reset with parameter O4-13.
U4-08	heatsink temperature	Shows the heatsink temperature in °C.
U4-13	Max. output current	Displays the max. current during RUN status.

R5.4 Pressure Monitor U7-XX

U7-02	Reference for the system pressure	Displays the reference for the suction pressure in Bar in the system and will be set with parameter P1-03 in standard applications.
U7-03	System pressure	Displays the actual suction pressure in the system in Bar.
U7-04	Compound Counter	Once the ystem is reaching the conditions to switch ON or OFF the 2nd compressor a down counter will display the remaining time.

This is only a selection from the Yaskawa manual YEG-SIEP C7 10606 19a of the screens mostly in use and does not demand any requirements for completeness.

Oil-Reflow-, Crankcase Heater-function, Maintenance L4

Para-meter Number: | Range min. max. | Default Setting Value: | Change during operation | Parameter-description

Oil-Reflow-function L4.1

Time oil reflow in seconds

P2-06 | 0 | 300 | 300 | N

Frequency Oil-Reflow in Hz

P2-07 | 0 | 400 | 35 | N

Once the V1000 is running with an output frequency which is below the value set in parameter P2-07 for the time set in parameter P2-06 the oil-reflow function will become active.
Caution: Once the oil-reflow is active the user must ensure that all refrigeration load will be switched on to avoid tripping due to low system pressure.

Oil-reflow running time in seconds

P2-08 | 0 | 300 | 60 | N

Once the oil reflow function is active the V1000 will accelerate the compressor to rated speed for the time set in this parameter.

Output relay MA/MC

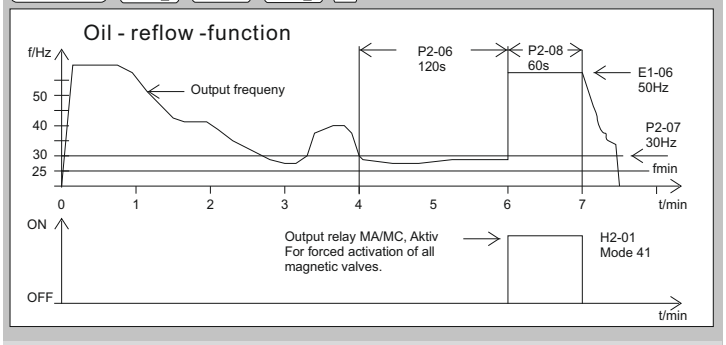
h2-01 | 0 | 192 | 41 | N

Mode "41" for the output relay will be used to switch on all refrigeration load in the system while the oil-reflow mode is active.

Oil-Reflow at start

P2-09 | 0 | 1 | 0 | N

Once this function is active (Mode 1) the V1000 will run with rated speed for the time set in parameter P2-08 at every time it gets a start command.



Crankcase heater auto-mode L4.2

Caution: This function is only valid if the ambient temperatures of the V1000 and compressor are identical!

Temperature heater ON

P3-01 | 0 | 50 | 10 | N

Interval to check temperature

P3-02 | 0 | 600 | 15 | N

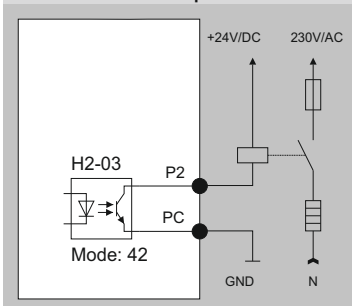
Normally every time a standard compressor will be stopped the crankcase heater will be activated. The V1000 series can read the heatsink temperature, in this mode the drive will activate the crankcase heater individually once the temperature is below the setting in P3-01. Parameter P3-02 is used for the time to check the heatsink temperatur periodically. This will ensure that the heater will be active, only on demand.

Output relay MA/MB/MC

h2-01 | 0 | 192 | 42 | N

Mode "42" for the output relay MA/MC secures that the oil reflow function will become active through the output relay of the drive. Alternative Optocouplers: H2-02 Output P1; H2-03 Output P2

Example crankcase heating with output P2 L4.3



Caution: The configuration for a opto coupler output requires an external power supply of 24V/DC.
Specification:
Activate the crankcase heater once the ambient temperature is below 20°C.
Parameter:
P3-02 = 20,0°C (Temperature)
P3-03 = 30,0 Min (Sample rate)
h2-03 = 42 (Mode)
Function:
+ Once the ambient temperature is below 20°C the crankcase heater will activated at every standstill of the compressor.
+ The V1000 will be warmed up during operation. so the heatsink needs to cool down before measuring will start.
+ The setting of Parameter P3-02 to 30min. will ensure that the crankcase heater is ON for the first 30min, afterwards depending on the heatsink temperature the heater will be switched OFF if the temperature is still above 20°C. This will be checked every 30 minutes.

Ccaution: This function is only valid if the ambient temperature of V1000 and compressor is identical!
Because of the internal switch mode power supply of the V1000 the heatsink might be slightly warmer than the compressor.

Maintenance Counter

P3-03 | 0 | 300 | 100 | N

Determines the maintenance interval. Once the running time exceeds this value the following message appears in the display: "Calm3 Maintenance required". Max.: 30000h; Default: 10000h

Remarks: The V1000 will not trip, only a warning will be displayed.
In case this happens the counter could be reset by setting a new value for e.g. 10000h.
The message / alarm will disappear.

L5 Check-list Commissioning

L5.1 Remarks:

The following list is not demanding any requirements for completeness. Qualified personal on site is responsible that the equipment will comply with relevant standards an law.

L5.2 Proceedure:

L5.2.1 Check of the variable speed drive:

+ Type:	CIMR-	
+ Serial number:		
+ Fuses:		A
+ Supply cable:		mm²
+Voltage:		V

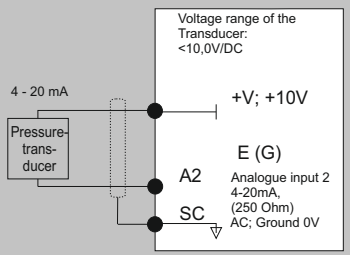
L5.2.2 Compressor check:

+ Manufacturer:		
+ Type:		
+ Max. operating current:		A
+ Refrigerant:		
+ Evaporation temperature:		°C
+ Evaporation pressure:		Bar

L5.2.3 Transducer Check :

+ Manufacturer:		
+ Type:		
+ Range:		
+ Anschluss:		

Check transducer connection. The supply voltage for the transducer must not exceed 10V/DC ;20mA.



L5.2.4 Power ON, Status messages:

The display will show the Evaporation pressure after power ON once all settings were done correctly.

Wrong connection of the pressure transducer or even not connected will display the following message after power ON.

Modes for In- and Outputs R4

Modes digital inputs S3 to S6 (h1-01 - h1-06) R4.1

Modes:	Description	Function:
03	Multi-step speed 1	Der V1000 betreibt den Motor mit der in Parameter D1-02 (oder h3-09 = Modus 2) festgelegten Ausgangsfrequenz. Werkseinstellung für Eingang S5.
04	Multi-step speed 2	Der VC1000 betreibt den Motor mit der in Parameter D1-03 festgelegten Ausgangsfrequenz. Werkseinstellung für Eingang S6.
05	Multi-step speed 3	Der V1000 betreibt den Motor mit der in Parameter D1-05 festgelegten Ausgangsfrequenz.
06	JOG-speed	Der V1000 betreibt den Motor mit der in Parameter D1-17 festgelegten Ausgangsfrequenz. Hat Vorrang vor den anderen Sollwerten.
08	Ext. base block n.o.	External base block (no), the drive output will be switched OFF once a signal occurs at a digital input. This will be indicated with a "bb" message in the display.
09	Ext. base block n.c.	External base block (nc), the drive output will be switched OFF once signal gets lost at a digital input. This will be indicated with a "bb" message in the display.
0F	Not used	This particular input is without function.
14	Fault RESET	On signal input the V1000 will be reset after it tripped, this mode is default for digital input S4. The cause for the trip must be fixed before reset will be activated.
15	Emergency-Stop	Signal input at a digital input with this mode will stop the motor with the ramp rate set in parameter C1-09.
19	PID-loop OFF	On signal input the V1000 will switch OFF the PID loop.
24	Ext. fault n.o.	On signal input the V1000 will tripp with fault message "EFX" (X=S**3** bis S**6**). It needs a reset signal to restart.
25	Ext. fault n.c.	Once signal gets lost at a digital input of the V1000 it will tripp with fault message "EFX" (X=S**3** bis S**6**). It needs a reset signal to restart.
2C	Ext. fault warning n.o.	On signal input the V1000 will indicate a warning message "EFX" (X=S**3** bis S**6**) on the display. It will continue to run.
2d	Ext. fault warning n.c.	Once signalgets lost at a digital input of the V1000 it will indicate a warning message "EFX" (X=S**3** bis S**6**) on the display.
35	PID-loop Invert	On signal the PID loop signal will be inverted.

Modes digital outputs 1 to 3 (h2-01 - h2-03) R4.2

00	During Run	Closed: A run command is active or voltage is at the output. Default for output 2 (P1) =h2-02.
01	Zero speed	Closed: Output frequeny is zero.
02	User set speed agree 1	Closed: Output speed equals the speed reference (plus or minus the hysteresis set in L4-02 (Band width).
06	V1000 is ready	Closed: Drive ready. The drive is powered up, not in a fault state and in DRIVE mode.
0C	Frequency reference loss	Closed: Loss of the analogue frequency reference detected. Enable when L4-05 = 1.
0E	Fault	Closed: Fault occured (other than CPF00 and CPF01)
10	Minor fault	Closed: An alarm is triggered.
20	oH pre alarm	Closed: Heatsink temperature exceeds parameter L8-02 value; Default: 95°C
37	During frequency output	Closed: Frequency is given to the output. Open: Operation stopped; baseblock; DC injection braking or initial excitation is performed.

Modes analogue input A2 (h3-10) R4.3

02	2. reference	Once one of digital inputs S3 to S7 is programmed in mode 3, analogue input A2 will be used as reference frequency (Standard A1).
0b	feedback for PID-loop	With this mode the analogue input A2 is used as a feedback source for the PID loop.

Modes analog outputs AM (h4-01) R4.4

01	Frequency refernence	Shows the actual frequency reference as a 0-10V signal, 10V = max.fFrequency.
02	Output frequency	Shows the actual output frequency as a 0-10V signa. 10V = max. frequency according to E1-04.
03	Output current	Shows the actual output current of the V1000. 10V = rated current of the V1000 Frequenzumrichters.
24	PID-feedback value	Shows the actual PID feedback signal. 10V = 100% feedback value.

This is only a selection from the Yaskawa manual YEG-SIEP C7 10606 19a of the screens mostly in use and does not demand any requirements for completeness.

Para-meter Number: | Range min. max. | Default Setting Value: | Change during operation | Parameter-description

Motor nameplate frequency
E1-06 | 0 | 400 | 60 | N

Motor nameplate voltage
E1-13 | 0 | 510 | 400 | N

Rated motor frequency and voltage, is needed to adjust the V/Hz curve.
Example: 87Hz Operation:

Motor 230/400V; connected in Delta
E1-04 = 87Hz max. Output frequency
E1-05 = 400V max. Output voltage
E1-06 = 50Hz Base frequency (Nameplate)
E1-13 = 230V Motor rated voltage

Motor rated current
E2-01 | 0 | 99.9 | 0 | N

With the input of the rated motor current the V1000 will calculate a thermal model of the connected motor to protect against over-heating. If the compressor would run too long at low speed, it will trip with fault "OL1."

Number of motor poles
E2-04 | 2 | 48 | 4 | N

Determines the amount of motor poles and is used as basic data to calculate the auto-tuning function..

Motor nameplate power
E2-11 | 0 | 99.9 | 0 | N

Determines the motor shaftpower and is used as a basic data for the calculation of the autotuning function. Default values may differ due to the size of the variable speed drive.

Modes digital inputs S1 to S6
h1-01 | 0 | 78 | 0 | N

Modes digital inputs S1 to S6
h1-06 | 0 | 78 | 0 | N

The mode of the digital inputs S1 - S7 is selectable according to table R6.1.
The default settings are:

S1 = Start forward command (h1-01)
S2 = Start reverse command (h1-02)
S3 = 24 External fault (h1-03)
S4 = 14 RESET (h1-04)
S5 = 03 Multifrequency 1 (h1-05)
S6 = 04 Multifrequebcy 2 (h1-06)

Modes digital outputs 1, 2, 3
h2-01 | 0 | 192 | E | N

Modes digital outputs 1, 2, 3
h2-03 | 0 | 192 | 2 | N

The digital outputs MA/MB/MC, P1/PC; P2/PC are free selectable according to table R4.2.
The default values are:
MA/MB/MC = "E"; Fault (h2-01)
P1/PC = "0"; During RUN (h2-02)
V1000 has received a start command or is already running.
P1/PC = "2" Speed agree 1" (h2-03)

Gain analogue Input A1
h3-03 | 0 | 100 | 100 | J

Sets the level of the analogue input A1 when 10V is input at terminal A1.
Parameter **H3-10** determines the gain on analogue input A2
Range: -999,9 to 999,9

Bias analogue Input A1
h3-04 | 0 | 100 | 0.0 | J

Sets the level of the analogue input A1 when 0V is input at terminal A1.
Parameter **H3-11** determines the bias for analog ue input A2
Range: -999,9 to +999,9%

Modes for analogue Input A2
h3-10 | 0 | 31 | 6 | N

This function determines the functions of analogue input A2 and can be selected with table R6.3.
Parameter H3-02 determines the functions for analogue input A1.

Function analogue Output AM
h4-01 | 1 | 31 | 6 | N

The function of the 0-10V analogue output FM is depending on the settings in accordance with the monitor screens at page R5.
Range: 0 to 999.

Gain analogue output AM
h4-02 | 0 | 100 | 100 | J

Determines the gain of the analogue output AM.
Range: -999,9 to 999,9%

Bias analogue ouput AM
h4-03 | 0 | 100 | 0 | J

Determines the bias (Offset) of the analogue output AM.
Range: -999,9 to +999,9%

Power loss operation mode
L2-01 | 0 | 2 | 0 | N

Determines the reaction of the V1000 on momentary power loss:
0 = Trips with fault: **Uv1** (Undervoltage)
1 = Re-start dependung on settings of **L2-02**
2 = Re-start as long CPU is active

Number of Autorest starts
L5-01 | 0 | 10 | 0 | N

Determines how often the V1000 will automatically reset the drive after it tripped with fault and will try to start again.
.

Fault reset interval time
L5-04 | 0.5 | 600 | 10 | J

Once the V1000 trips with acitve auotreset function (**L5-01**) this parameter will set the time to wait until the start shall happen.
The deley time for the re-start is given in seconds.

Function "STOP"-key
o2-02 | 0 | 1 | 1 | N

Once the Start/Stop control is given through the terminals the STOP can be set as follows:
0 = STOP-key is disabled
1 = STOP-key is enabled.

Mode copy function
o3-01 | 0 | 3 | 0 | N

This function has got the following modes:
0 = Normal operation
1 = READ from V1000 to Display
2 = WRITE from Display to V1000
3 = COMPARE

Activate copy function
o3-02 | 0 | 1 | 0 | N

Before using the copy function it must be activated.
Mode 0 = Copy function not active
Mode 1 = Copy function is active

This is only a selection from the Yaskawa manual YEG-SIEP C7 10606 19a of the screens mostly in use and does not demand any requirements for completeness.

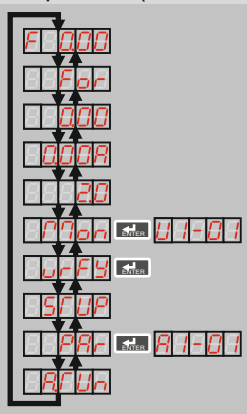
Variable speed drives YASKAWA V1000 series L6.1

CIMR-	Compressor			
	Bitzer	Bock	LÙnite	Frascold
VC4A0002 1,8A 0,55kW			TAJ4452Z TAJ4461Y	
VC4A0004 3,4A 0,75kW	2KC-05.2(Y)		TAJ2428Y TAJ2446Z TAJ2464Z TAJ9480Z TAJ9510Z TAJ4492Y TRK5450 TRK5480 TRK5512	
VC4A0005 4,8A 1,5kW	2JC-07.2(Y) 2HC-1.2(Y)	HG(X)12P60-4S HG(X)12P75-4 HG(X)12P75-4S	TAJ4511Y TFH2480Z TFHD2516Z TAJ9513Z TAJ4517Z TFH4518Y TAJ5515C	A 0.5 4Y A 0.5 5Y A 0.7 6Y A 1.6 Y
VC4A0007 5,5A 2,2kW	2HC-2.2(Y) 2GC-2.2(Y) 2FC-2.2(Y)	HG(X)12P90-4 HG(X)12P90-4S HG(X)22P/125-4	TFH2511Z TFHD2522Z TAJ4519Z	A 1.7 Y
VC4A0009 7,2A 3,0kW	2FC-3.2(Y) 2EC-2.2(Y) 2EC-3.2(Y) 2DC-2.2(Y)	HG(X)12P-110-4 HG(X)12P110-4S HG(X)22P/110-4 HG(X)22P/110-4S HG(X)22P/125-4S HG(X)22P/160-4	TFH4522Z TFH4524Z TFH4528Y TAJ5519C TAJ5522C	A 1.5 8Y B 1.5 9Y B 1.5 10Y
VC4A0011 9,2A 4,0kW	2DC-3.2(Y) 2CC-3.2(Y)	HG(X)22P/160-4S HG(X)22P/190-4	TFH4531Z TAG4528Y TAG4534Y TFH5524C TFH5528C TFH5532C	B 2. 10.1Y D2 11.1Y C2 12Y
VC4A0018 14,8A 5,5kW	2CC-4.2(Y) 4FC-3.2(Y) 4FC-5.2(Y) 4EC-4.2(Y)	HG(X)22P/190-4S HG(X)34P/215-4 HG(X)34P/215-4S HG(X)34P/255-4 HG(X)34P/255-4S HG(X)34P/315-4	TAG2516Z TAGD2516Z TFH4540Z TAG4546Z TAGD4590Z TAGD4610Z TAG4553Z TAGD4568Y TAG4537Y TAG4543Y TAGD4556Y TAGD4574Y TAGD4586Y TFH5538C TAGD5590C TFH5542C TAG5546C TAGD5610C TAG5553C	C3 12Y C 3 12Y D2 13.1Y D2 15.1Y D3 15.1Y D3 16.1Y D3 19.1Y F4 19.1Y Q 4 19.1Y
VC4A0023 18,0A 7,5kW	4EC-6.2(Y) 4VES-6Y 4DC-5.2(Y) 4DC-7.2(Y) 4CC-6.2(Y) 4VCS-6.2(Y)	HG(X)34P/315-4S HG(X)34P/380-4 HG(X)4/310-4	TAG2522Z TAGD2544Z TAG4561Z TAGD4612Z TAGD4614Z TAG4568Z TAG5561C TAGD5612C TAG5568C TAGD5614C	D4 16.1Y F4 16.1Y D3 18.1Y D4 18.1Y D4 19.1Y F5 19.1Y Q5 19.1Y Q4 21.1 Y F4 24.1Y Q4 24.1Y
VC4A0031 24,0A 11,0kW	4VES-10Y 4CC-9.2Y 4VCS-10.2(Y) 4TCS-8.2Y 4TES-8Y 4TES-12Y 4PCS-10.2Y 4PES-10Y	HG(X)34P/380-4S HG(X)4/310-4S HG(X)4/385-4 HG(X)4/465-4	TAG4573Z TAGD4615Z TAG5573C TAGD5615C	F5 24.1Y Q5 24.1Y Q4 25.1Y Q7 25.1Y Q5 28.1Y
VC4A0038 31,0A 15,0kW	4TCS-12.2(Y) 4PES-15Y 4NCS-12.2(Y) 4NES-12.2Y 4J-13.2(Y)	HG(X)4/385-4S HG(X)4/465-4S HG(X)4/555-4 HG(X)4/650-4		Q7 28.1Y

This table is neither demanding completness nor can be guaranteed a technical correctness.
The following criteria must be considered on every selection:
The max. operationg current of the compressor is less than the rated current of the selected V1000 model.

L7 Operation and + Programming

L7.1 Function of the operator (LED Text Display)



Displays Reference

Forward or **Rev**erse

Output frequency

Output current

System pessure in Bar (Displayed at start)

Access monitor screens

Access changed parameter

Quickstart menu

Access to programming parameter

Auto-Tuning

UMSCHALT / RESET - key
Selects the acive digit, works also as RESET-key

ENTER - key
Selects all modes, parameters, settings etc.

ESC - key
Returns to the previous menu before **ENTER** key was pressed.

LOCAL/REMOTE - key
Local: Control via operator
Remote: Contro via terminals

Pressing **UP** -key or **DOWN** - key
Selects parameter and. increases or decreases the requested values

F1 and F2 - keys
Additional functions with different options

RUN - key
Starts the V1000

STOP - key
Stops the V1000

Remark: This manual must be seen in additon with the standard manual no: A1000 QSG Deutsch.pdf.

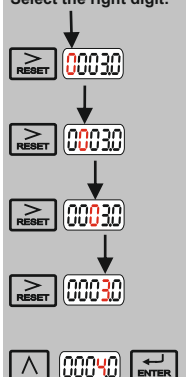
L7.2 Programming example

Change suction pressure from 3,0 to 4,0 Bar in parameter P1-03.

Press key unitl display shows (Highlighted RED is LED Displays):

PAR programming	Enables acces to all parameter
Press ENTER key	Selects parameter group “Programming” Display: A1-00 (”A” is blinking)
P1-01 minTransducer	**P**- is blinking Parameter group P is selected
P1-01 minTransducer	**1**- is blinking Parameter group P1 is selected
P1-**01** min Transducer	**01**- is blinking Parameter P1-01 is selected
P1-**03** Pressure reference	03 is blinking (on default) Shows value in paramete P1-03
002.5bar Pressure reference	Blinking shows the digit which can be changed,
002.5bar New reference	Pressing ““RESET” key will change digit
003.5bar New reference	Press UP or DOWN and modify to new value.
INPUT OK (For ~ 3sec)	Once data input has mede correct, INPUT OK will be displayed in the LCD display.

Select the right digit:



Press **Reset** - key
will select the appropriate digit..

> Change value with **UP** or **DOWN key**.

> Confirm data input with the **ENTER** - key.

Change value:

0004.0 ENTER **Enter-key confirms data input**

Value increase

0003.0

Value decrease

0002.0 ENTER **Enter-key confirms data input**

Mostly used standard-parameter I R2

Para-meter Number: | Range min. max. | Default Setting Value: | Change during operation | Parameter-description

Language selection
A1-00 | 0 | 6 | 2 | N
Determines the language selection of the LCD-Display of the V1000.
0=English; 2=German; 3=French
4=Italian; 5=Spanish; 6=Portugese

Parameter access level
A1-01 | 0 | 2 | 2 | N
Determines parameter access for the user:
0 = Read only (Apart from A1-01; A1-04)
1 = Only user parameter A2-01 to A2-32
2 = Read and write access for all parameter.

Select control mode
A1-02 | 0 | 3 | 2 | N
Selects the motor control mode
0 = V/Hz control
2 = OLV Open loop vector control
5 = PM Open loop vector control

Initialization
A1-03 | 0 | 333 | 0 | N
Sets the V1000 back to default values:
0 = No Initialization
1110 = Init. User Parameter
2220 = Init. Default values (2-Wire)
3330 = Init. 3-wire Control

Reference source selection
b1-01 | 0 | 5 | 5 | N
Determines the reference source:
0 = Digital operator
1 = Analogue inputs via terminals
2 = Serial Communication
3 = Option PCB, **5 = CASE-Software**

RUN Command selection
b1-02 | 0 | 5 | 5 | N
Determines source for the RUN command:
0 = Digital Operator
1 =>Digital Inputs via terminals
2 = Serial Communication
3 = Option PCB; **5 = CASE-Software**

Stop-command selection
b1-03 | 0 | 3 | 1 | N
Determines the stopping method:
0 = Stop with rampe rate C1-01
1 = Spin Stop
2 = DC-Braking to stop
3 = Coast with timer

Reverse operation lock
b1-04 | 0 | 3 | 0 | N
Permits or prohibits reverse operation mode:
0 = Reverse mode enable
1 = Reverse mode disabled

PID-function setting
b5-01 | 0 | 3 | 1 | N
0 = PID disabled
1 = PID Active

Proportional gain setting
b5-02 | 0.0 | 25.0 | 3 | J
Sets the proportional gain of the PID loop.
Caution: A too high gain may cause un-stability in the system. A too low value may increase the PID error..

Integrationszeit
b5-03 | 0.0 | 360 | 2 | J
Sets the integral time of the PID loop.
Caution: A too short time may cause un-stability in the system. A too slow time may increase the PID error.

PID-Output level selection.
b5-09 | 0 | 1 | 1 | N
Sets the output direction:
0 = normal --> Decreasing feedback will increase output signal.
1 = Invers --> Increasing feedback will increase output signal.

Acceleration time in seconds
C1-01 | 0.0 | 600 | 3.0 | J
Determines the acceleration ramp rate after receipt of a start signal from 0Hz to max speed according to parameter E1-04; Default: 60Hz

Deceleration in seconds
C1-02 | 0.0 | 600 | 3.0 | J
Determines the deceleration ramp rate after receipt of a stop signal from max. frequency to 0Hz according to parameter E1-04; Default: 60Hz

Carrier frequency
C6-02 | 0 | F | 1 | N
Default values are depending on the size of the V1000:
0=Low carrier frequency mode
1=2,0kHz; 2=5kHz; 3=8,0kHz; 4=10,0kHz; 5=12,5kHz; 6=15,0kHz; F=Free programm.

Fixed speed D1-01 to D1-16
d1-01 | 0 | 60.0 | 0.0 | J
There are up to 16 multi step frequencies which can be set via the terminals S3 to S6. D1-16 determines the frequency once the feedback pressure refence gets lost. Default: 30 Hz.

Jog frequency reference
d1-17 | 0 | 60.0 | 6.0 | J
The JOG frequency has got priority against other frequency references. Needs a digital input to be active parameter h1-XX in mode “6”.

Upper frequency limit
d2-01 | 0 | 110 | 100 | N
Sets the upper limit of the output frequency as a percentage of the max. output frequnecy according to E1-04.

Lower frequency limit
d2-02 | 0 | 110 | 50 | N
Sets the limit limit of the output frequency as a percentage of the max. output frequnecy according to E1-04.

Maximum output frequenz
E1-04 | 40 | 400 | 60.0 | N
Determines the max. output frequency of the connected motor.
The following conditions must be fullfilled:
E1-04 => E1-06 => E1-07 => E1-09

Max. ouput voltage
E1-05 | 0 | 510 | 400 | N
Determins the max. output voltage and is needed to adjust the V/Hz curve of the connected motor/Compressor.
See: E1-06 and E1-13

This is only a selection from the Yaskawa manual YEG-SIEP C7 10606 19a of the screens mostly in use and does not demand any requirements for completeness.