

**Variable Speed Drive
YASKAWA GA500 - Series
with „Refrigeration - Software“**

KSW7-II



Quick Start Guide:
YASKAWA
Variable Speed Drive
GA500-Series with additional Software
for speed control of compressors and
integrated compound controller

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P2.1 Important Screens:

	System Pressure	Shows the actual system pressure in „Bar“ or „°C“. If parameter P9-01 is set to mode „0“ No units displayed. The content is scaled by parameter: P9-02 (Sensor Min.Value) and P9-02 (Max.Value)
	Pressure Setpoint	Shows the actual setpoint determined by unit setting in parameter P9-01. The content is scaled by parameter: P9-02 (Sensor Min.Value) and P9-03 (Max.Value).
	Counter Display 	Shows the remaining time in seconds once a change in the actual status will happen. For example activate or de-activate a second compressor. the blue timer symbol is indicating availabilzy in U7-04.
	Maintenance Counter	Shows the remaining time for the next maintenance of the system and is depending on the settings of P3-03. Once the time is elapsed the message „NAIn“ appears in the display. This is only an alarm message and does not cause a trip of the variable speed drive. Maintenance counter can be reset by add „1“ to the counter in Parameter P5-01.
	Condensing Pressure	In case a pressure transducer is connected at analogue input A1 (0-10V) This monitor will display the actual pressure value scaled in parameter: P9-02 (Sensor Min.Value) and P9-03 (Max. Value)
	Signal for Fan-Control	Shows the actual output-signal (0-10V) of the GA500 for the control of an EC-controller for a condensing fan.
	Counter Working hours	Displays the working hours of the device controlled by the inverter.
	Amount of Starts	Counts the amount of starts of the GA500 series. Together with the working hours an average value of starts per hours can be calculated.
	Heat sink temperature	Displays the actual temperature on the heat sink of the GA500 series in „°C“.

P2 Content - Important Screens

The GA500 series has got a 7 Segment LED Display with 5 digits for programming, monitoring and commissioning. Via a standard RJ45 networking cable an optional graphical display may ease handling. The maximum cable length should not extend 15m.

Within 3 steps ready to operate

P3.1

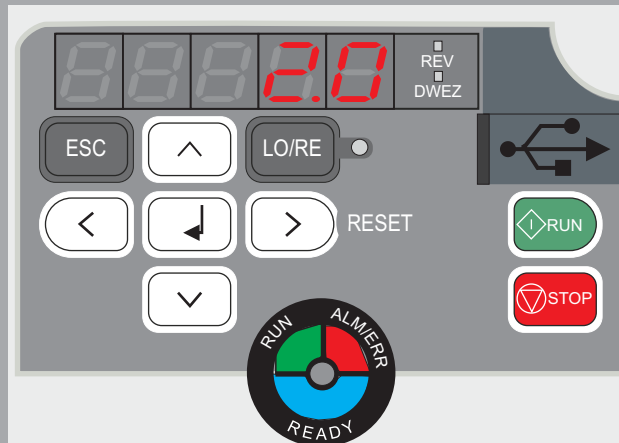
1 The LED Display

5 - digit LED - Display

Pres  -  - key and select menus or parameter, respectively increase or decrease the adjusted settings.

 ENTER- key enables execution of the selected program, menus or parameter.

 - key, returns to previous menu before ENTER was pressed.



Connector for USB cable enables connection with a PC via USB2.0 Type A and Type Mini B

 - Key Starts the GA500 in local mode

 - Key Stops the GA500 via display

 - Key
Local: Control via display (PID loop not active)
Remote: Control via terminals

Colour	ON	OFF	BLINKING
READY	RUN/READY	Fault	Sto
RUN	RUN	Stop	ACC/DEC
ALM/ERR	Fault	No Fault	Alarm

LED Status - Display.

2 Menus

Reference
(No Function KSW7)

Direction
(No Function KSW7)

Output frequency in Hz

Output current in amps

Suction pressure in Bar
Will be displayed after
„Power ON“

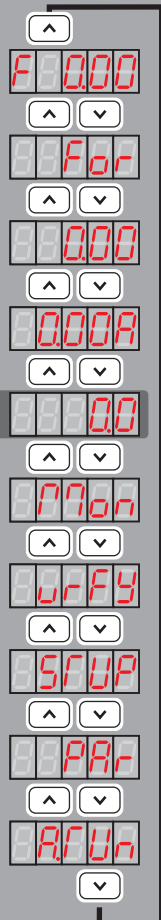
Monitor display group

Modified Parameter

Short menu
(No Function KSW7)

Programming group

Auto-Tuning menu



3 Programming example

Changing setpoint from 1.0 Bar to 3.0 Bar

Screen after „Power ON“
Feedback signal from the Sensor

Parameter Group
Changing settings

First parameter group:
Menu: A (blinking)

Change to parameter group
„P“ (blinking)

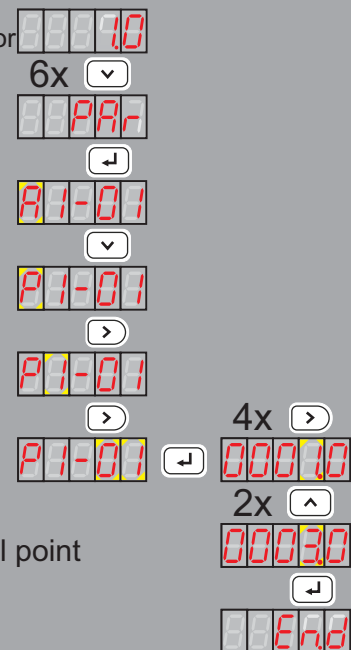
- Refrigeration - screens
Changes to sub-group
P1 (Blinking)

Changes parameter no..
P1-01 (01 Blinking)

 Enables data input
select   decimal point
set   Value

 Confirm data input

Remark: A restart after parameter modification requires to leave the programming group and return to the drives menu and a new start command afterwards.



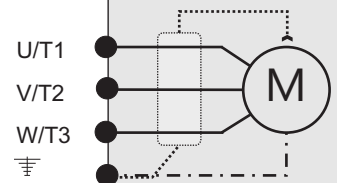
P4 Standard-Wiring

Supply: 400 V/AC / 50Hz

Remark:
Safety standards as per the manual must be considered

YASKAWA GA500 Series

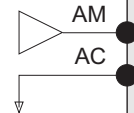
CAUTION:
No start permitted in programming mode.



Start-Stop command: h1-01=40 (no)
(B1-02 = 5); Page: S13

S1 Default: H1-01: „40“
Start CW

AM Analogue output 1
0-10V or 4-20mamps
Default:
Output frequency 0-10V



Ext. Fault: H1-03=24 (no)
Ext. Block: H1-03=8 (no)

S2 Default: H1-02: „41“
Start CCW

S3 Default: H1-03: „24“
External fault

Relay output:
Rated values:
240 V/AC 1,0 A
28 V/DC 1,0 A

Setpoint change
H1-04=80 (no)

S4 Default: H1-04: „14“
Reset

Relay MA/MB/MC
Default:
H2-01
„E“ Fault



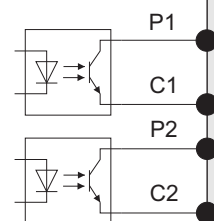
H1-05= XX (nc)

S5 Default: H1-05: „3“
Multi-frequency 1

H1-06= 84 (no);
Page S16

S6 Default: H1-06: „4“
Multi-frequency 2

Output P1
Default: „0“
H2-02
„0“ Run
Output P2
Default: „1“
H2-03
„2“ Speed agree



H1-07=83 (no);
Page S16

S7 Default: H1-07: „6“
Jog - frequency

SN
Do not connect supply
voltage to the control
terminals.

Connection between „SN“
and „AC“ in case you use
+24V/DC (SC) for the supply
of the pressure transducer!

Connection transducer

AC

SC

SP +24V/DC / max. 150amps

+V +10,5V/DC / max. 20mamps

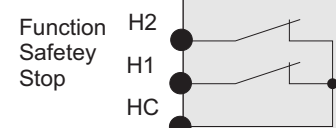
pressure
trans-
ducer

4-20mamps (ND)

A2 Analogue input A2 (4-20mamps)
Pressure value

A1 Analogue input A1(0-10V)
For ext. pressure reference or
reference selection function

AC Ground
Analogue input



Caution:

All settings are pre-programmed for a pressure transducer with the following data: 8-30V/DC;
Signal: 4-20mamps; Range: -0,8 to 7,0 Bar; Others can be adapted by modifying parameter P9-05/-06.

 P1-01 Default: 1.0Bar Min: -100.0 Max: +100.0	→ Modify Parameters during RUN → Default → Min. Range → Max. Range	 → Stop to change Parameter Parameter change during RUN ←  ↙ Parameter-Description
 P1-01 Default: 1.0Bar Min: -100.0 Max: +100.0	Pressure Reference Setpoint	Determines the setpoint for pressure control. Default unit is Bar to control the suction pressure. Optional units e.g temperature control, need a change in parameter P9-04 (Only with graphical display).
 P1-02 Default: 0.5Bar Min: -50.0 Max: +50.0	AUTO-OFF Level	Once the feedback level is below the value in Parameter P1-02 for the time set in P1-03 the GA500 switches automatically OFF. Example: With the default setting the value needs to be less than 0.5Bar for 0.0 seconds to switch OFF the inverter automatically.
 P1-03 Default: 0sec Min: 0 Max: 3000	AUTO-OFF Time 	This parameter is not active in case P1-02 is set to 0.0.
 P1-04 Default: 1.0Bar Min: 0.0 Max: 40.0	AUTO-ON Hysteresis	These parameter determine the conditions to switch ON again after the Ga500 activated the AUTO OFF function. Once the signal level exceeds the level programmed in P1-04 for the time set in P1-05 it will restart automatically. Example: With the default setting the value needs to be more than 1.5Bar for 20.0 seconds to switch ON the inverter automatically again.
 P1-05 Ab Werk: 20sec Min: 0 Max: 3000	AUTO-ON Hysteresis TIME 	P1-02 = 0,5Bar; P1-04 = 1,0Bar ON Level: 0,5Bar + 1,0Bar = 1,5Bar P1-02 + P1-04
 P1-06 Default: 0.0Bar Min: -20.0 Max: +20.0	2. Reference via digital input	Once a digital input becomes active and has been set to mode „80" (h1-XX), the reference will change in accordance with the setting in this parameter. Example: P1-01 = Reference 1 = 3,0 Bar P1-08 = -2,0 Bar --> New reference: 1,0 Bar.
 P1-07 Default: 1.5Bar Min: -50.0 Max: +50.0	Low Pressure (LP) Level at Start	At every start the GA500 will reduce the AUTO OFF level to the level set in parameter P1-07 for the time set in parameter P1-08. This function is de-activated once P1-08 is set to „0".
 P1-08 Default: 0.0sec Min: OFF Max: 3000	Low Pressure (LP) level at Start Time	

P6 P1 - Alarm Control

 P1-09 Default: Mode 3 Min: 0 Max: 3	Start-Behavior	Determines the start behavior of the GA500 after Power ON: 0: Sleep-function is not active 1: Start with delay set in P1-05 in sec. 2; Immediate Start after power ON 3: Start pending on settings P1-02+P1-04/P1-07
 P1-10 Default: 100 Min: - 100.0 Max: +100.0	Alarm because of deceeding low level setting	Determines the level to activate an alarm. It could be used to prevent the system against frost. The behavior of the GA500 is determined by the level which is below P1-10 for the time in P1-11 and the reaction in parameter P1-12. Once the P1-10 level revovers within the time P1-11 the timer will be reset to „0" again. The unit for the display is determined in parameter P9-01 (P1-20=1) or P9-04 (P1-20 = 0).
 P1-11 Default: 0=ÔFF Min: 0s Max: 3000	Alarm delay	
 P1-12 Default: 0 Min: 0 Max: 3	Behavior of the GA500 in case alarm level is below setting	Once the conditions in accordance with P1-11 & P1-12 are reached the GA500 will act as follows: 0: Only display via a digital output (Mode „45"); GA500 will continue to run. 1: Display via a digital output and „Base Block“ until value has exceeded P1-10 level again. 2: Display via a digital output (Mode „45") and „Base Block“ until value has exceeded P1-10 level again, digital output status will remain active until next stop command. 3: GA500 will trip with fault „CFAL2". Mode for the digital output: H2-XX = „45h“
 P1-13 Default: 100 Min: - 100.0 Max: +100.0	Alarm because of exceeding high level setting	Determines the level to activate an alarm. It could be used to prevent the system against high pressure. The behavior of the GA500 is determined by the level which is above P1-13 for the time in P1-14 and the reaction in parameter P1-15.
 P1-14 Default: 0=OFF Min: 0s Max: 3000	Alarm delay	Once the level is below P1-13 within the time P1-14 the timer will be reset to „0" again. The unit for the display is determined in parameter P9-01 (P1-20=1) or P9-04 (P1-20 = 0).
 P1-15 Default: 0 Min: 0 Max: 3	Behavior of the GA500 in case alarm level is above setting	Once the conditions for P1-13 & P1-14 are reached the GA500 will act as follows: 0: See Parameter P1-12 1: See Parameter P1-12 2: See Parameter P1-12 3: See Parameter P1-12
 P1-16 Default: 0=OFF Min: 0s Max: 300	„Pump-Out“ behavior of the GA500 	In operations with temperature control an additional pump out mode may be activated. The GA500 will accelerate for the time set in this parameter to rated speed and switch off in case the timer expired or a digital input in mode „85" has been activated.

S6 P1 - Alarm Control

 P1-00 Default: 1 Min: 0 Max: 5	Feedback source Selection	Determines the feedback source selection 0: Analogue input A1 as reference (0-10V) 1: Analogue input A2 as reference (4-20mA) 5: Both inputs in use, the higher value of both Inputs (in %) is the one in use for the system pressure in use.
P2-00	Compound Controller	On demand it is possible to add on a second compressor direct on line (DOL). This needs to program the output relay MA/MB/MC to mode „40" to act as a compound controller.
 P2-01 Default: 58.0Hz Min: d2-02 Max: E1-04	Frequency to switch ON the 2nd compressor	Once the output frequency exceeds the value programmed in parameter P2-01 for the time set in P2-02, the GA500 will activate the digital output which was set to mode „40" and activate a second compressor in this circuit. Example:
 P2-02 Default: 10sec Min: 0 Max: 3000	Delay time to switch ON the 2nd compressor 	In the default settings the output frequency must exceed a frequency of 58Hz for minimum 10sec to activate the output programmed in mode „40".
 P2-03 Default: 3.0Bar Min: -100.0 Max: +100.0	Level to switch OFF the 2nd compressor	Once the feedback level is below the value programmed in parameter P2-03 for the time set in P2-04, the GA500 will de-activate the digital output which was set to mode „40" and switch OFF the second compressor in this circuit. Example:
 P2-04 Default: 10sec Min: 0 Max: 3000	Delay time to switch OFF the 2nd compressor 	In the default settings the output frequency must below a value of 3.0Bar for minimum 10sec to switch OFF the output programmed in mode „40".
 P2-05 Default: 0 = OFF Min: OFF Max: 25	Max Starts/h	Compressors do have a limited start capacity per hour, This parameter is the thermal protection of the 2nd compressor by monitoring the amount of starts per hour is exceeded GA500 will show „Comp" at the display. The running of the GA500 is not effected by this.
 A1-06 Default: 4 = Freq2 Min: 0 Max: 1FF	Feedback Safety circuitry Compressor 2	Each Compressor in the cooling system can give feedback to the actual status via signal to a digital input of the GA500. Once the safety circuitry is interrupted the GA500 will stop this particular compressor. Mode „84" determines the feedback from the DOL compressor.
 A1-07 Default: 6 = JOG Min: 0 Max: 1FF	Feedback Safety circuitry Compressor 1	Each Compressor in the cooling system can give feedback to the actual status via signal to a digital input of the GA500. Once the safety circuitry is interrupted the GA500 will stop this particular compressor. Mode „83" determines the feedback from the speed controlled compressor.

P8 P3 - Control Condensing Pressure

 P2-06 Default: 0 = OFF Min: 0 Max: 1	Emergency Mode	In case the speed controlled compressor fails, in mode „1“ the GA500 may activate the 2nd compound compressor direct on line (DOL) to prevent the system against a total loss of Power.
 P3-00	Condensing Control	With the use of a 2nd pressure transducer at the analogue Input A1 the GA500 is able to measure the condensing pressure and generate a 0-10V output signal for the condensing fans. Additionally load may reduced once condensing pressure exceeds a certain value.
 P3-01 Default: 12.0Bar Min: -100.0 Max: +100.0	Setpoint Condensation-Pressure	This parameter determines the setpoint for the condensing pressure. Default settings are „Bar“ and units can be changed in parameter P9-04 (Only LCD Text-Display) to temperature values.
 P3-02 Default: 5.0Bar Min: 00.0 Max: 50.0	OFF - Level Condensation Pressure	Once the pressure feedback level is below this parameter the analogue output „AM“ will automatically decrease to „0V“. Example: In default modes the condensation pressure needs to be lower than 5.0 Bar to get a 0V signal at the output „AM“.
 P3-03 Default: 5.0Bar Min: 00.0 Max: 50.0	Hysteresis ON-Signal Condensation Pressure	The GA500 will activate the output „AM“ once the level determined by parameter P3-03 exceeds the hysteresis level of this parameter. Example: In default mode the condensing pressure must exceed 10,0 Bar to release a 0-10V to the analogue output „AM“.
 h3-02 Default: 0 Min: 0 Max: 31	Function Analogue Input A1 Condensation Pressure Feedback	Mode „22“ of this parameter determines that the analogue input A1 is used for the condensing pressure feedback. The signal is scalable via parameter P1-02 (Min Value) & P1-03 (Max. Value).
 h4-01 Default: 102 Min: 000 Max: 999	Function Analogue Output AM 0-10V Signal Condensation Fan Control	Mode „707“ of this parameter determines that the analogue output AM is used to control the condensing pressure via a 0-10V signal for the fan-control. The settings of the PI loop are possible via parameter P3-04 (P-gain) & P3-05 (I-time).
 P3-04 Default: 5.0 Min: 0.0 Max: 50.0	P-Gain Controller Condensing Pressure	With the P-Gain in P3-04 and the Integration time in P3-05 the internal PI-Loop controller will be used to create a 0-10V signal for the condensing fan. Therefore the analogue Input A1 (h3-02) and the analogue Output AM (h4-04) must be configured to achieve good results. Caution: A too high gain in P3-04 or too short integration time in P3-05 may cause instability of the output signal. Settings too low may cause delays and increase reaction time.
 P3-05 Default: 5s Min: 0 Max: 50.0	I-Time Controller Condensing Pressure	

P8 P3 - Condensing Pressure Control

 P3-06 Default: 22.0Bar Min: -100.0 Max: +100.0	Pressure Load Reduction Active	This parameter determines, together with the time set in parameter P3-07, the level where the load reduction function is becoming active. It will reduce the load by lowering the output frequency set in parameter P3-08.
 P3-07 Default: 10s Min: 0 Max: 500	Time Load Reduction 0=OFF	Example: In the default settings the condensing pressure must exceed a pressure of 22,0 Bar for minimum 10sec to get activated. Once this function is active, the output speed will decrease to 45Hz as per parameter P3-08.
 P3-08 Default: 45.0 Hz Min: d2-02 [%] Max: E1-04 [Hz]	Frequency Load Reduction	This parameter determines the level of the load reduction with a fixed speed signal set in this parameter. With the lower output speed the refrigeration power will be reduced and the pressure in the condensation system will decrease as a result of these settings.
 P3-09 Default: 16.0Bar Min: -100.0 Max: +100.0	Pressure level to Return to Normal Conditions	In case the condensing pressure returns below the value set in this parameter for the time set in parameter P3-10 the GA500 will return to standard working conditions. The Load-Reduction-Function could be indicated by a dig. output in mode „44" while it is active.
 P3-10 Default: 30sec Min: 0 Max: 500	Time to Return to normal conditions	Example: With the default settings the condensing pressure must be blow 16.0 Bar for minimum 30sec. The GA500 will automatically return to normal working conditions.
P3-108	Condensing Pressure Cut Off with Base Block	
 P3-11 Default: 0.0=OFF Min: 0.0Bar Max: 100.0	Cut-Off Pressure with Base Block „bb“ 0,0 Bar = OFF	Determines a pressure level where the GA500 will automatically switch off the output frequency once it will exceed this value. It will return to normal once pressure is below P3-09 for the time set in P3-10 . A digital output in mode „48" may indicate this externally.
P3-108	Condensing Pressure with fault trip	
 P3-12 Default: 0.0=OFF Min: 0.0Bar Max: 100.0	HP Fault „CASE FAL3“ 0,0 Bar = OFF	Determines a pressure level where the GA500 will trip with fault „CASEFAL3" once it will exceed this value. A reset signal is required to bring it back to normal conditions.

P10 P5 -Maintenance Counter & Software De- Activation
P6 - Summer- / Winter - Control

	Maintenance & Software This parameter group contains the reset of the maintenance counter und de-activation of the refrigeration software for direct control respectivley operation with standard references and setpoints.
 Default: 10000h Min: 0 Max: 50000	Maintenance Counter Determines a working hour period which must be exceeded to start an alarm with the message "NAIn". A new intervall will start once the counter is set to a new value by adding „1". (E.g.: 10000h + 1 = 10001) The alarm will disappear, the GA500 will not trip due to this alarm.
 Default: Modus 0 Min: 0 „KSW" Max: 1 „OFF"	De-Activation Refrigeration Software With this parameter it is possible to operate without refrigeration software as standard drive. It changes the following parameter: b1-01: 5 ➔ 1 H3-09: 2 ➔ 0 b1-02: 5 ➔ 1 H3-10: 20h ➔ 0 b5-01: 1 ➔ 0 H3-02: 20h ➔ 0
 Default: 0sec Min: 0 Max: 3000	Condensing Unit Control This parameter group enables the optimal Adaption to the control of a condensing fan. A fast pressure increase at hot ambient temperatures and a slow reaction in cold environment guarantee the best result for an optimized condensing unit.
 Default: Mode 0 Min: 0 „OFF" Max: 1 „ON"	Condensing control Active Once this parameter is: set to „1" the following settings will change automatically: B5-02: 3.00 ➔ 11.00 P9-02: -0.8 ➔ 0.0Bar B5-03: 2.0 ➔ 8.0s P9-03: 7.0 ➔ 30.0Bar C1-02: 3.0 ➔ 5.0s P9-05: -0.8 ➔ 0.0Bar C6-02: 3 ➔ 6 P9-06: 7.0 ➔ 30.0Bar D1-01: 60.00 ➔ 36,9Hz P1-01: 1.0 ➔ 14.0Bar D2-02: 50% ➔ 10% P1-02: 0.5 ➔ 13.0Bar E1-03: F ➔ 6 P1-03: 0.0s ➔ 2.0s L1-02: 1.0 ➔ 2.0Min P8-03: 60s ➔ 0s This change adapts automatically to a broader range of the pressure transducer.
 Default: 16.0Bar Min: 5.0 Max: 50.0	Summer control „Active" Determines the level to switch over to the PI loop for „summer control". With this any pressure increase at higher ambient temperatures the reaction cycles are much quicker and high pressure errors can be avoided.
 Default: 8.00 Min: 0.0 Max: 25.0	P-Gain PI-controller Summer - Control Determines the P-gain of the control signal to correct the deviation between reference and set-point. The higher this value the quicker the reaction. Caution: An overvalued setting will cause oszillations and unstable behavior of the unit.
 Default: 0.5sec Min: 0.0 Max: 360	I-Time PI-controller Summer - Control Determines the I-time of the control signal to correct the deviation between reference and set-point. The shorter this time the quicker the reaction. Caution: An overvalued setting will cause oszillations and unstable behavior of the unit.

P6 - Sommer- Winter control for condensing units P11
P7 - Crank Case Heater - Operation

 P6-05 Default: 25.0sec Min: 0.0 Max: 60.0	Time Summer-Control Function Active	Determines the time where the „Summer Control Function“ remains active. Once the time is elapsed it will change to the standard PI settings for condensing pressure control. P-Gain: Standard: B5-02: 8.0 I-Time Standard: B5-03: 11.0sec
 P6-06 Default: 4.0Bar Min: 0.0 Max: 15.0	Winter-Control Function Active	Determines the level where the „Winter Control Function“ becomes active. Below this level the settings of the PI loop are less dynamic to avoid any shutdowns due to low pressure in the system.
 P6-07 Default: 1.00 Min: 0.0 Max: 25.0	P-Gain PI-Loop Winter Control	Determines the P-gain while the „Winter Control Function“ is active. The higher this value, the faster the reaction in case of a deviation between setpoint and feedback signal. Caution: An overvalued setting will cause oscillations and unstable of the unit.
 P6-08 Default: 5.0sec Min: 0.0 Max: 360	I-Time PI-Loop Winter Control	Determines the I-time while the „Winter Control Function“ is active. The smaller this value, the faster the reaction in case of a deviation between setpoint and feedback signal. Caution: An overvalued setting will cause oscillations and unstable of the unit.
 P6-09 Default: 25.0sec Min: 0.0 Max: 60.0	Time Winter-Control Function Active	Determines the time where the „Winter Control Function“ remains active. Once the time is elapsed it will change to the standard PI settings for condensing pressure control. P-Gain: Standard: B5-02: 8.0 I-Time Standard: B5-03: 11.0sec
P7-00	Special functions Refrigeration Software GA500	This parameter group offers additional functions to control crank case heater, cold start, power adaption by hotgas bypass activation
 P7-01 Default: 10.0°C Min: 0.0 Max: 50.0	Activation Crank Case Heater	Normally while a compressor is stopped the crank case heater gets activated. The GA500 is measuring the heat sink temperature periodically and pending on the setting in parameter P1-07 it will activate the heater in case the temperature is below this value. The time interval in parameter P7-02 is proofing the temperature. It will ensure that the heater will remain active as long the temperature does not increase. A digital output must be set to mode „42". The GA500 must be installed in the same environment than the compressor.
 P7-02 Default: 15Min Min: 0 Max: 600	Temperature- Interval Crank Case Heater	
 A2-00 Default: Mode 0 Min: 0 Max: 192	Function Output Relay to activate Crank Case Heater	It is necessary to activate an output relay in mode „42" in case the crank case heater function will be used. The use of the heat sink temperature of the GA500 for the crank case heater requires the GA500 in the same environment.

P6 - Summer- & Winter Control / P7 - Crank Case Heating P11

P12 P7 - Cold-Start Behavior, Hotgas-Bypass Control

 P7-03 Default: 45.0Hz Min: d2-02 Max: E1-04	Cold-Start Frequency	Once a digital input has been set to mode „82" the GA500 will control the compressor with a fixed speed set in parameter P7-03. It needs a signal at this input together with a start command. The duration of this speed is determined in parameter P7-04. The GA will return to standard compressor control once this time is elapsed. During the cold-start mode being active the internal pump down function is not active. This function could be used with an external thermostat which will activate the cold start mode at low ambient temperatures.
 P7-04 Default: 300s Min: 0 = OFF Max: 3000s	Time Cold-Start 	
 A8-08 Default: Mode 0 Min: 0 Max: 192	Input S4 Selection (h1-04) for Cold-Start Application	To activate the cold start mode a digital input is programmed in mode „82". It needs a start-command on input S1 and a signal at this particular input to activate the cold start function for the time which was set in parameter P7-04.
 P7-05 Default: 0.8Bar Min: -100.0 Max: +100.0	Cold-Start with Hot-Gas-Bypass Active	It is possible to activate a digital output while the cold start function is in operation and the feedback level is below this setting. This could be used to activate a hot-gas-bypass valve to force the internal start-up process. The digital output needs to set to mode „43".
 P7-06 Default: 2.0Bar Min: -100.0 Max: +100.0	Level Hot-Gas-Bypass ON	Once the GA500 is operating on the lower frequency limit set in parameter (d2-02) and the system pressure is below setpoint for the time set in P7-07 it will activate the digital output which was set to mode „43".
 P7-07 Default: 0sec Min: 0=OFF Max: 300	Time Hot-Gas-Bypass ON	On applications where the compressor power is still too high even the compressor is running at minimum speed a hot-gas-bypass valve can be activated to compensate this through „power extinction".
 P7-08 Default: 50Hz Min: d2-02 Max: E1-04	Frequency for De-Activation Hot-Gas-Bypass Mode	In case the demand for refrigeration is increasing again and the hot-gas-bypass mode is still active the out frequency will raise and the GA500 will accelerate. This parameter determines the output frequency where this mode gets de-activated.
 A8-08 Default: Mode 0 Min: 0 Max: 192	Function of the Output relay for Hot-Gas-Bypass Control	A digital output needs to be programmed in mode „43". It enables the output to get active once the conditions in parameter P7-06 and P7-07 are fulfilled.

P12 P7 - Cold-Start Behavior, Hotgas-Bypass Control

	Special Functions Oil Re-Flow Emergency Mode Vacuum Mode	This parameter group is containing function to ensure proper oil flow in the system to avoid oil dislocation in the evaporator for example. In case the speed controlled compressor is not working the GA500 offers an emergency operation of the DOL compound compressor.
 Default: 300sec Min: 0.0 Max: 3000	Time to Activate Oil-Re-Flow Function	In case the compressor is running with a frequency below the setting in parameter P8-01 for time set in parameter P8-02, it automatically will activate the Oil-Re-Flow function. The GA500 will accelerate the compressor to rated speed (E2-06) for the time set in parameter P8-03. Once this time is elapsed it will turn back to normal compressor control.
 Default: 25.00Hz Min: d2-d2 Max: E1-04	Frequency Oil-Re-Flow	With this setting a possible oil-dislocation in the evaporator will be removed. The re-flow process will initiate a higher flow of the refrigerant due to the higher speed than before.
 Default: 60sec Min: 0=OFF Max: 3000	Duration Oil-Re-Flow Remains Active	Remark: With a default value of 25Hz, this mode is not active with the standard settings. The min. frequency is 30Hz and determined in parameter d2-02 (50% of E1-04 = 60Hz) and therefore this function is disabled.
 Default: Mode 0 Min: 0 Max: 192	Function of the Output relay for the Oil-Re-Flow	In some applications it is required to avoid low pressure cut offs once the oil-re-flow function is active. In this case a digital output could be used in mode „41“ to force a magnetic valve in the refrigeration circuit to remain open even though no demand is happen.
 Default: Mode 0 Min: 0 Max: 1	Oil-Re-Flow at Start	This function will became active in mode „1“ of this parameter. After receipt of a Start command the GA500 will accelerate the compressor to rated speed for the time set in parameter P8-03. Once this time is elapsed, it will change to standard compressor control.
 Default: 45,0Hz Min: d2-02 Max: E1-04	Feedback Lost Frequency	In case the feedback signal gets lost it is possible to operate the compressor with a fixed speed. The display will show „FbLST“ and the red Alarm LED is blinking. This depends on the settings in parameter parameter b5-12.
 Default: 0 Min: 0 Max: 5	Behavior on Feedback Loss	Behavior in case of feedback loss: 1 : Activate output, (H2-0X, „10“) 2 : Alarm + output (H2-0X, „10“) 3 : Only output at PID ON (H2-0X, „10“) 4 : Alarm + output at PID ON (H2-0X, „10“) 5 : Fault + output active at PID ON (H2-0X, „0E“)
 Default: 60sec Min: 0=OFF Max: 600	Activate Vacuum-Mode	This function will help to evacuate the refrigerant from the cooling circuit. A digital input needs to be set to mode „81“. On receipt of a signal the GA500 will operate the compressor at rated speed (E2-06) for this time. The pressure OFF function in parameter P1-02 is not active.

P14 P8 - Start Profile

 P8-07 Default: 0sec Min: 0=OFF Max: 300	Duration Start Delay  Determines the delay between receipt of a start command and the start of the compressor.
 P8-08 Default: Mode 0 Min: 0 Max: 3 	Mode selection Start Delay Determines the behavior in case the start delay is active (Display: „DEL“ & Alarm (Blinking)) 0: Only delay 1: Delay and output active Parameter h2-XX in Mode „49“ 2: Delay and output active, feedback required Out: h2-xx → „49“ / Input h1-xx → mode „87“ (“DEL & Alarm“ blinking until signal receipt). 3: Delay and output active, Feedback required Out: h2-xx → „49“ / Input h1-xx → mode „87“ Fault „CFAL1“, in case no signal returns until time set in P8-07 is elapsed. Displays once delay is active (Blinking)
 P8-09 Default: Mode 0 Min: 0 Max: 192	Function of the Output relay for Start - Delay In case a start delay it is possible to activate a relay for any further device to start. The selected digital output needs to be set in mode „49“ to become active. This will be valid in case parameter P8-08 was set to mode 1, 2 or 3.
 P8-10 Default: 0Hz Min: 0=OFF Max: E1-04	Frequency 1 after Start Command These 2 parameters determine a fixed speed and a time for the compressor after receipt of a start command. Once the time in parameter P8-10 is elapsed the GA500 will change over to the standard control.
 P8-11 Default: 0sec Min: 0=OFF Max: 3000	Duration 1 after Start Command Some compressors require such a start behavior to ensure that stepper motor drivers for electronic expansion valves are settled. During this time the pressure OFF function in parameter P1-02 is not active.
 P8-12 Default: 0Hz Min: 0=OFF Max: E1-04	Frequency 2 after Start Command These 2 parameters determine a second fixed speed and time for the compressor after receipt of a start command. Once the time in parameter P8-10 is elapsed the GA500 will accelerate to the 2nd speed until the time in parameter P8-12 is elapsed and the GA500 will change over to the standard control.
 P8-13 Default: 0sec Min: 0=OFF Max: 3000	Duration 2 after Start Command Some compressors require such a start behavior to ensure that stepper motor drivers for electronic expansion valves are settled. During this time the pressure OFF function in parameter P1-02 is not active.
 P8-14 Default: 1.000sec Min: 0 Max: 10.00	Filter Feedback Signal Determines the filter-time of the display. It could be used for the damping of the display in case the feedback signal is changing too fast.

P14 P8 - Start-Profile

	Sensor Alignment This parameter group determines the sensor selection and alignment to display the setpoint and system values as real values and units.
  Default: 1=Bar Min: 0=None Max: 2=°C	Unit selection Analogue Input A1 In case the graphical display is in use, the units of the signal at input analogue input A1. set in this parameter will be displayed.
  Default: -0.8Bar Min: -100.0 Max: +100.0	Lower Range Transducer Analogue Input A1 The parameter P9-02 and P9-03 determine the Range of the Transducer connectet at the analogue input A1. They are the reference for the set-point. In default mode the display monitors the suction pressure of the system in the unit „Bar“. Without changes they determine a range with the following specifications: Voltage range: 8 to 30V/DC Signal: 0-10V/DC Pressure range: -0,8 to 7,0 Bar.
  Default: 7.0Bar Min: -100.0 Max: +100.0	Upper Range Transducer Analogue Input A1 It is possible to align different Transducer ranges with these 2 parameters.
  Default: 1=Bar Min: 0=Ohne Max: 2=°C	Unit selection Analogue Input A2 In case the graphical display is in use, the units of the signal at input analogue input A2. set in this parameter will be displayed.
  Default: -0.8Bar Min: -100.0 Max: +100.0	Lower Range Transducer Analogue Input A2 The parameter P9-05 and P9-06 determine the Range of the Transducer connectet at the analogue input A2. They are the reference for the set-point. In default mode the display monitors the suction pressure of the system in the unit „Bar“. Without changes they determine a range with the following specifications: Voltage range: 8 to 30V/DC Signal: 4-20mamps or 0-10V/DC Pressure range: -0,8 to 7,0 Bar.
  Default: 7.0Bar Min: -100.0 Max: +100.0	Upper Range Transducerr Analogue Input A2 It is possible to align different Transducer ranges with these 2 parameters.

P16 Fault- and Alarm Messages

00-00

Max. Amount
of Starts/h
exceeded

Alarm message once the tolerable amount of starts determined in parameter P2-05 were exceeded.

Remark: This message will automatically disappear once the intervall time has been passed. E.g.: P2-05 = 10Starts/h. This setting would enable a restart of the compressor every 6 Minutes. In case this alarm would appear after 4Minutes the GA500 would wait further 2 Minutes with the activation.

00001

Missing Feed-
back on Dig.
Input X

The feedback message on the digital input (H1-0X) programmed in mode „87" is outstanding and the GA500 trips with this fault message.

Remark: Once parameter P8-08 is set to mode „3" and an output is programmed (e.g. H2-0x; Mode „49") a feedback signal is required for this input. This must happen within the time programmed in parameter P8-07. This function is helpful in systems where active pumps are forced to run continuously.

00002

Feedback
Value too
high or low

The feedback value at Input A2 is lower than P1-10 for the time set in P1-11 with parameter P1-12 set to mode „3".

OR

The feedback value at Input A2 is higher than P1-13 for the time set in P1-14 with parameter P1-15 set to mode „3".

00003

High
Condenstion
Pressure

Once the feedback value of the condensation pressure at analogue Input A1 does exceed the setting P3-12 the GA500 will trip with this fault message.

00F00

00F00

The feedback signal from the safety chain of compressor 1 or 2 is interrupted and the GA500 did switch off the 2nd compressor.

Remark: This fault requires a digital input (h1-XX) which is set to mode „84" (Comp 1) (nc) or „84" (Comp 2)(nc).

Caution: The GA500 will automatically re-start the compressor after the problem was fixed and the signal is back on this particular input!

00F00

Feedback
Fault

The parameter P8-07 determines an adjustable delay time for a start command. Additionally a digital output (H2-XX Mode: „87") may activate one further device. This device might give a feedback to a digital input of the GA500 (H1-XX Mode: „49"). In case in parameter P8-08 is set to mode „3" the GA500 will trip with fault „FbrEL" after the time in P8-07 has elapsed.

Caution: The GA500 needs a reset after a tripping with „FBrEL"!

00C00

Emergency
RUN Active

Once the emergency mode is active (P2-06 Mode: „1"), a second compressor (h2-01 Mode „40") will switched ON and OFF by the GA500 output relay. This depends on the need even though the speed controlled compressor is not operating. During emergency run the Display is blinking.

Remark: This operation is pending on the GA500 software still working.

Caution: The GA500 must have a reset to finish the emergency mode!

00C00

Alarm Feed-
back lost
Sensor

This message will be displayed (Blinking) in case the pressure feedback signal gets lost and drive is running with the frequency set in P8-05 (Default: „45Hz").

In case parameter B5-12 is set to mode „5" the GA500 will trip in case feedback signal gets lost.

Remark: The GA500 turns to standard conditions once the signal gets back to normal values.

00000

Maintenance
Counter

Operates as a downcounter for the working hours of the GA500. From default it counts down the operation hours from 10000. Once it reaches „0" hours it will display „NAln". Set parameter „P5-01" to (10000+1/ First time, +2 second time, etc....) reset the display and the alarm will disappear.

Caution: This Alarm will not cause a tripping of the GA500 at all, it will continue to work, the alarm is only a reminder for a periodic inspection.

P16 Fault- and Alarm Messages

A1-00	Parameter Light-green background --> changeable during operation	
A1-02	Control Method	Method for Motor control 0 = V/Hz-Control; 2 = Vector-Control without feedback (Default) 5 = PM Vector Motor Control without feedback
A1-03	Initialize Parameter	Sets parameter back to default mode: 0 = No Initializing; 1110 = Init. User parameter 2220 = Init. Default settings (2-Wire); 3330 = Init.3-Wire control
B1-01	Reference Source	Determines the source of the reference for the GA500 series with KSW7: 0 = Digital Operator; 1 = Analogue input via control terminals 2 = Serial Communication; 5 = CASE for „Refrigeration-Software“
B1-02	Start/Stop Source	Determines the source for a start command: 0 = Digital Operator; 1 = Digital Inputs via control terminals 2 = Serial Communication; 5 = CASE for „Refrigeration-Software“
B1-03	Stopping Method	Determines the behavior of the GA500 on receipt of a stop-command: 0 = Stop with deceleration ramp rate C1-01; 1 = Spin Stop 2 = DC-Brake until standstill; 3 = Spin Stop with delay
B1-04	Rotation Lock	Prevents a change in the motor rotation via the control terminals: 0 = Operation in both directions is permitted. 1 = Only one direction is permitted
B5-02	PI-Loop P-Gain	Determines the P-gain of the PID - loop . Caution: An overvalued setting will cause oscillations and unstable behavior of the unit; Default: 2.0
B5-03	PI-Loop I-Time	Determines the integration time of the PID Loop. Caution: An overvalued setting will cause oscillations and unstable behavior of the unit; Default: 3.0sec
C1-01	Acceleration Ramp Rate	Determines the acceleration ramp rate after receipt of a start command from 0Hz max. frequency (Parameter E1-04; Default: 60.0Hz). Default: 3.0sec
C6-02	Carrier Frequency	Determines the carrier frequency of the GA500. 0 = low carrier frequency; 1 = 2kHz; 2 = 5kHz; 3 = 8kHz; 4 = 10kHz; 5 = 12.5kHz; 6 = 15kHz. The default value setting is pending on the size of the GA500.
E2-01	Upper Limit Frequency	Determines the upper limit of the frequency reference in per cent of the max. output frequency (Parameter E1-04; Default: 60.0Hz). Default: 100% = f_{max} = 60.0Hz
E2-02	Lower Limit Frequency	Determines the upper limit of the frequency reference in per cent of the max. output frequency (Parameter E1-04; Default: 60.0Hz). Default: 50% = 30Hz @ 60Hz Maximum frequency
E1-04	Max. Frequency	The max. allowable output frequency, depends on the rated motor frequency and application. Default: 60.0Hz.
E1-06	Rated Motor Frequency	Rated Motor frequency and voltage are required to adapt the V/Hz curve: Example1: 87Hz operation, Motor 230/400V; connected in Delta: E1-04 = 87Hz max. output frequency; E1-05 = 400V max. output voltage E1-06 = 50Hz rated motor voltage; E1-13 = 230V rated voltage
E1-13	Rated Motor Voltage	Example 2: Variable torque application (Fan or pump) E1-04 = 50Hz max. output frequency; E1-05 = 400V max. output voltage E1-07 = 25Hz min. frequency; E1-08 = 100V mid voltage
E2-01	Rated Motor Current	The rated motor current will be used to calculate a thermal model to protect the motor against overload. Operation at low speed with reduced cooling may create an „OL1“ fault.
E2-11	Rated Motor Power	Determines the rated motor power in kW. This parameter is used as a basis for the Auto-Tuning function, default values are pending on the individual size of the inverter.

P18 Important Standard- Parameter II

h1-01
↑
h1-08

Modes
Dig. Inputs

The digital inputs S1 - S7 are free selectable. **Default settings:**
S1 = 40 Start CW (h1-01);
S2 = 41 Start CCW (h1-02);
S3 = 24 External Fault (h1-03);
S4 = 14 RESET (h1-04);
S5 = 03 Multi Speed 1 (h1-05);
S6 = 04 Multi Speed 2 (h1-06); S7 = 06 Jog frequency (h1-07);

Most
common
modes dig.
Inputs

08 Base Block
(no)
09 Base Block
(nc)
24 External Fault
(no)
89 Feedback-Relay
(KSW7, Page 14)

80 2. Reference
(KSW7, Page S5)
81 Vacuum Mode
(KSW7, Page S13)
82 Cold-Start ON
(KSW7, Page S12)

83 Feedback Comp. 1
(KSW7, Page S16)
84 Feedback Comp. 2
(KSW7, Page S16)
85 LP-Switch
(KSW7, Page 21)

h2-01
↑
h2-03

Modes
Dig. Outputs

The digital outputs MA/MB/MC, P1/C1 and P2/C2 are free selectable.
Default settings:
H2-01 (MA/MB/MC): „E“ Fault; H2-02 (P1/C1): „0“ During Run active
H2-03 (P2/C2): „2“ Speed agree
Each function can be inverted by setting a „1“ in front.
Example: Fault status: 0E --> 10E; Function is inverted.

Most
common
modes dig.
outputs

00 Inverter Ready
Startcommand given
0E Fault
Inverted: 10E
37 Inverter is ready
or running
40 Compound Mode
(KSW7, Page S7)

41 Oil Re-flow function
(KSW7, Page S13)
42 Crank Case heater
(KSW7, Page S11)
43 Hotgas-Bypass
(KSW7, Page S12)
44 Load Reduct. Active
(KSW7, Page 9)

45 Fehler Level 1
(KSW7, Page S6)
49 Feedback Relay
(KSW7, Page 14)
4A Pump Out Input
(KSW7, Page 21)

h3-02
↓
88822

Modes ana-
logue input
A1

Alternativley the analogue input can be used to determine the condensing pressure. This may help in of high pressure situations to reduce the output speed until the system is working again under normal conditions. Optionally it is possible to control via a 0-10V output signal an EC fan. Therefore this input must be programmed in parameter h3-02 to mode „22“. The transducer must have a 0-10V signal.

h4-01
↓
88803

Modes ana-
logue output
AM

The analogue output AM is free selectable.
Default setting:
H4-01 (AM/AC): „102“ (U1-02 = Output speed via 0-10V signal)
Setting parameter h4-01 to mode „707“ the GA500 is capable to create a speed signal for a condensing fan in case a pressure transducer is connected to A1 (h3-02 --> „22“)

L2-01

Power Loss
Operation

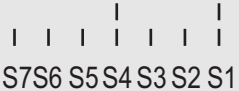
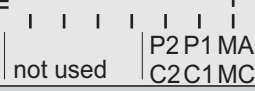
Determines the reaction of the GA500 on a momentary power loss.
0 = Trip with fault message; 1 = Re-Start depending on setting L2-02
2 = Automatic Re-Start as long as CPU is active

L5-01

Number of
Re-Starts

Determines the amount of Re-Starts after the GA500 will trip with fault message.

P18 Important Standard-Parameter II

Des- cription	Function
 DC-Bus Voltage	Displays the actual DC-Bus Voltage V/DC, $V/DC = \sqrt{2} * \text{Input Voltage (Supply Voltage } V_{in})$ 565V/DC / 1,414 = 400V V_{in}
 Status Dig. Inputs	U1-10 =  Example drawing left: Terminals S1 and S4 = Signal Other terminals = no Signal
 Status Dig. Outputs	U1-11 =  Example drawing left: Relay M1/M2 = Aktive M3/M4 and M5/M6 = not Aktiv
Fault-Analysis GA500 Monitor screens U2-XX and U3-XX	
 Fault-status	Shows status of the GA500 at the last trip because of a failure: U2-01: Actual Fault U2-02: Last Fault U2-04: Output frequency @ fault U2-05: Output current @ fault U2-07: Output voltage @ fault
	U2-08: DC-Bus Voltage @ fault U2-11: Status input terminals U2-12: Status output terminals U2-13: Operation status U2-14: Working hours
 Fehler-historie	Shows the fault history with the corresponding working hours: U3-01: Actual Fault U3-02: Last Fault U3-... : Second last Fault U3-10: 10th Fault
	U3-11: Working hours @ U3-01 U3-12: Working hours @ U3-02 U3-... : Working hours @ ... U3-20: Working hours @ U3-10 The following faults are not displayed: CPF01-CPF03; Uv1 and UV2.
Fault Messages	
 External Fault	A digital input was set to mode „24“ (no) or „25“ (nc) and the GA500 did trip with fault „EF X“ (X = No. Dig. Input) Check signals at the digital Input set with this mode.
 Ground Fault	Ground fault at the inverter output. Check: Working conditions without motor connected (test run) Insulation check of the motor
 Over-Current	Output current has exceeded 180% rated current. Check: Working conditions without motor connected (test run) Short circuit, Acceleration ramp rate too steep.
 DC-Bus Low level	DC-Bus Voltage is below 380V/DC. Check: Supply-Voltage and connections (> 350V/AC)
 Motor Overload	Motor overload due to the thermal model of the GA500 series which has calculated an overload, ramp rates too high Check: Rated motor current in E2-01, E1-02, Ramp rate: C1-01
 GA500 Overload	Overload GA500; Load too heavy, ramp rates too short; Check: Rated motor current E2-01; V/Hz Curve E1-02; Ramp rates too short C1-01 or C1-02
 Input Phase lost	One phase is missing from the supply voltage, noise level at the DC-Bus circuitry was too high. Check Input Voltage and fuses.
 Wrong Setting KSW7	The parameter settings of the KSW7 are wrong. E.g: Transducer range: -0.8 to 7.0Bar; Reference: 10Bar Check software settings KSW7

P20 Connect to a PC with Drive Wizard software from Yaskawa

Optional it is possible to link the GA500 series with the „Drive Wizard Software“ via a PC. This software enables it to read all parameter from the inverter and save it on a PC. The oscilloscope function measures and analyses values such as current and output frequency.

Drive Wizard with „Refrigeration-Software 7“

YASKAWA www.yaskawa.co.jp

Überblick Exportieren Email

Vorschau Drucken Parameter bearbeiten

Klicken Sie auf Vorschau, um die Parameter zu überprüfen oder den Ausdruck zu überwachen.

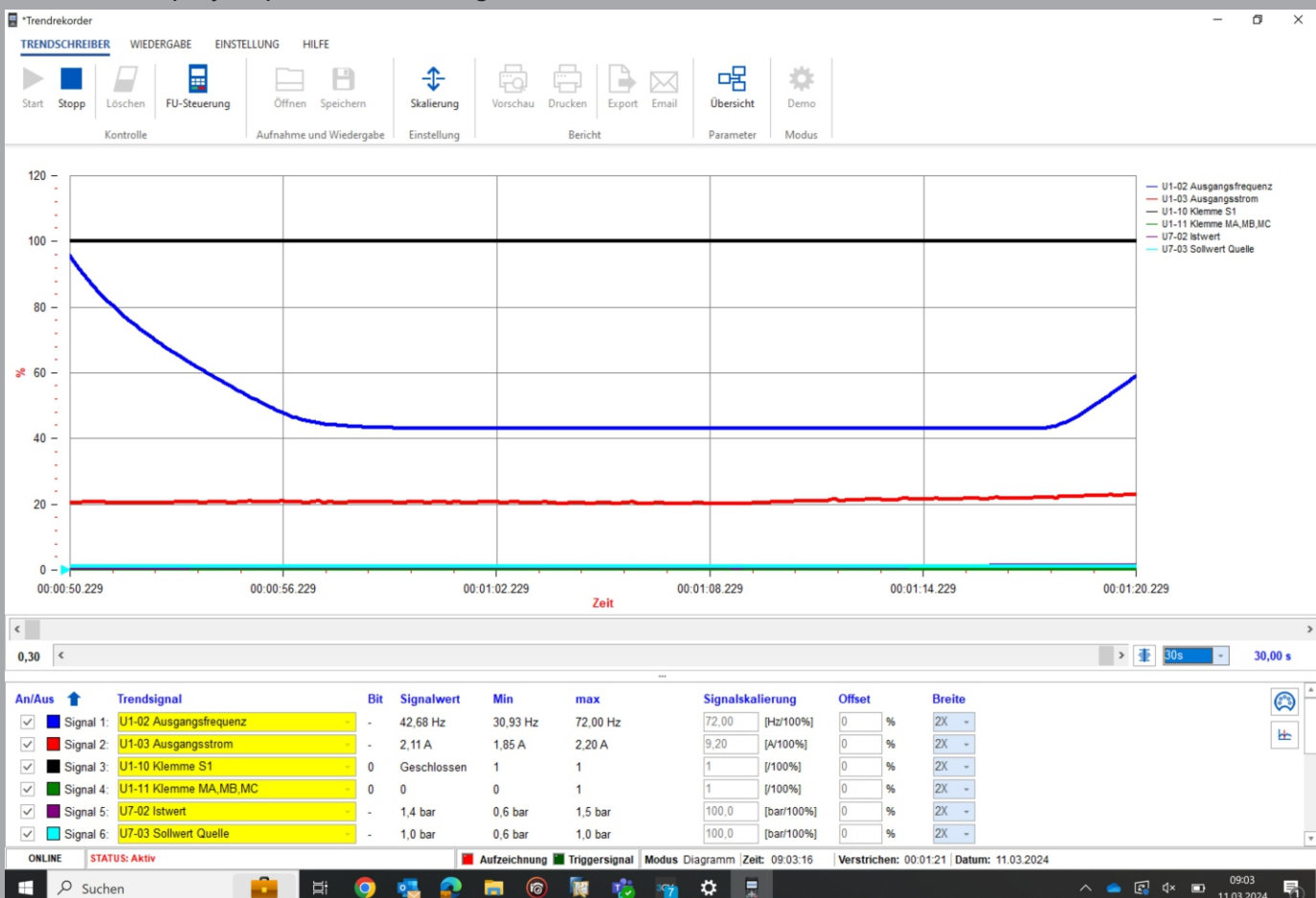
Parametergruppen GA500

Nein.	Parameter	Arbeitswert	Information (Einstellwert)	Standard
A1-02	Auswahl Regelverfahren	2	Vektorregelung ohne Rückführung	0
d1-17	Tippbetrieb-Frequenzsollwert	50,00 Hz		6,00 Hz
d2-02	Frequenzsollwert-Untergrenze	42,0 %		50,0 %
E1-04	Maximale Ausgangsfrequenz	72,0 Hz		60,0 Hz
H1-05	Klemme S5 Funktionsauswahl	0084	CASE Digitaleingang 5	0003
H1-06	Klemme S6 Funktionsauswahl	0083	CASE Digitaleingang 4	0004
H2-01	Klemme MA,MB,MC Funktionsauswahl	0040	Verbund Verdichter EIN	000E
H3-02	Klemme A1 Funktionsauswahl	20	Kompressor Regelung	00
H5-01	FU-Knotenadresse	01		1F
H5-04	Betriebsart bei Kommunik. fehler	2	Schnellstopp (C1-09 verwenden)	3
P1-01	Druck Sollwert	0,5 bar		1,0 bar
P1-02	Abschalt-Pegel	0,1 bar		0,5 bar

User languages: German & English

Caution: Communications parameter set as follows: H5-01 = 1 (Adress), H5-04=2.

Save and display of parameter settings:



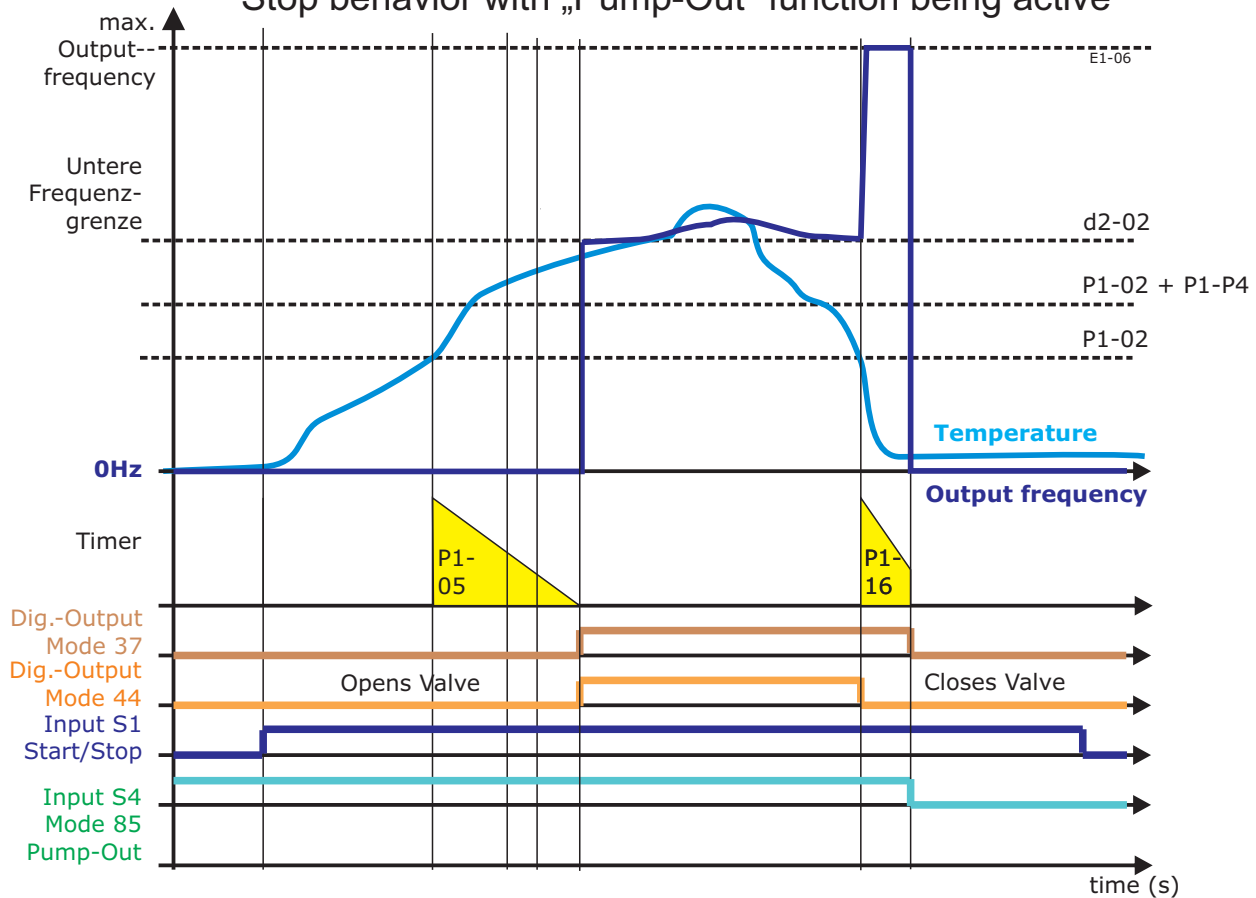
Oszilloscope function for data monitoring

Remark: For operation of the YASKAWA Drivewizard software with the PED „Refrigeration - Software“ a special driver is required. On demand available from PED free of charge.

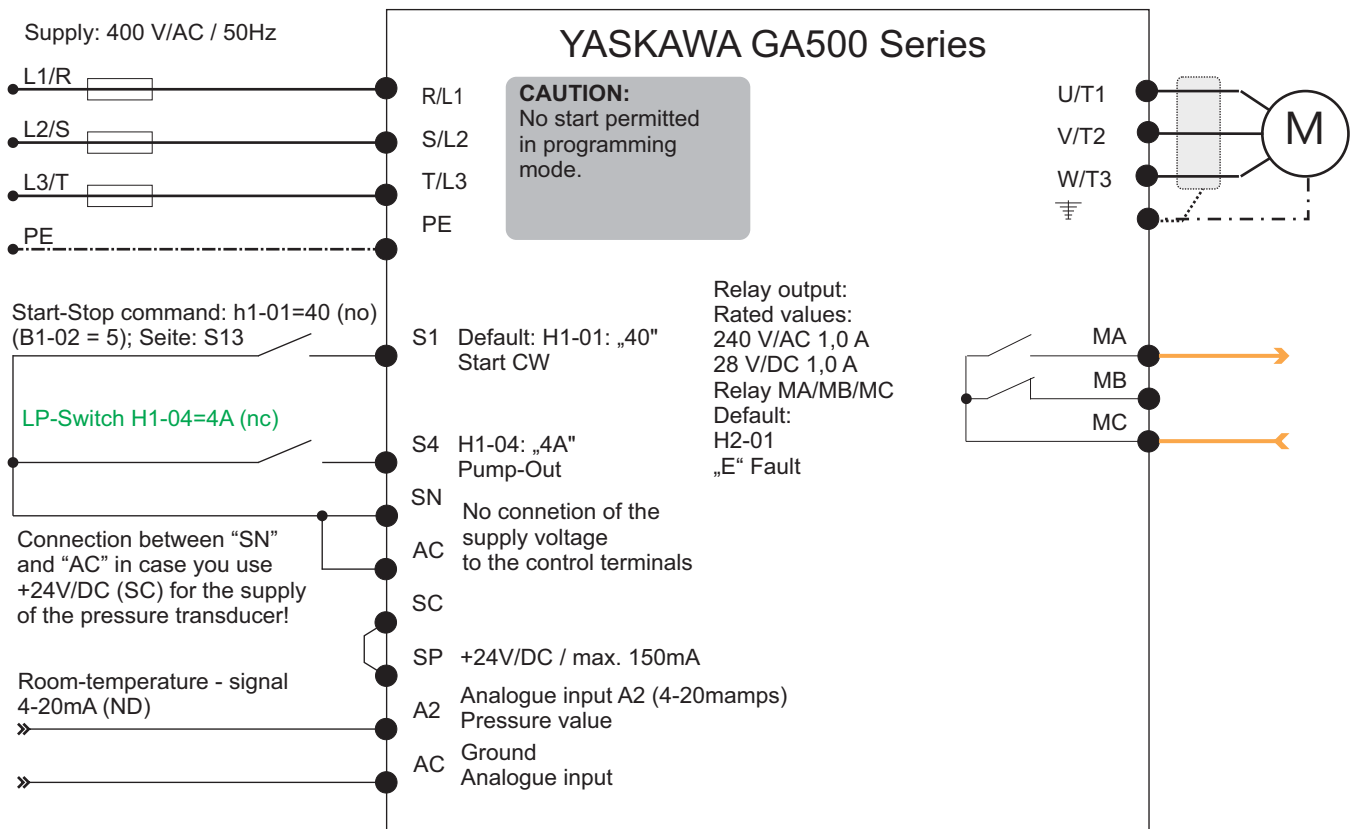
This driver will not be updated automatically.

P20 Connection to a PC

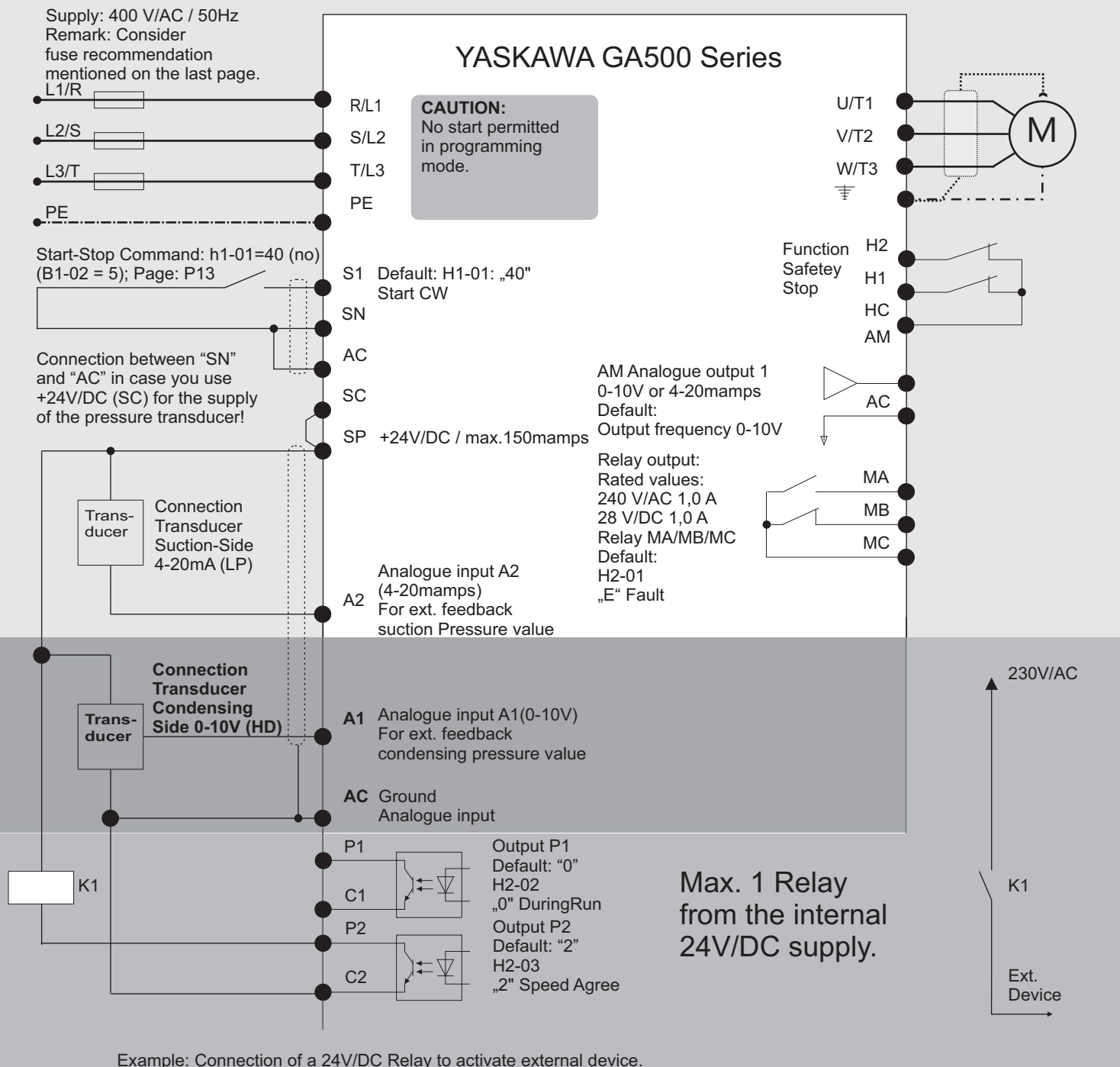
Stop behavior with „Pump-Out“ function being active



Wiring example



P22 Example control of a condensing fan Connection 24V/DC Relay



Parameter:

Parameter:	Function:	Range:	Default:	Recommendation:
P9-01	Lower Range Transducer	-100.0 to +100.0	0.0 Bar	See data sheet
P9-02	Upper Range Transducer	-100.0 to +100.0	30.0 Bar	See data sheet
P3-01	Condensing pressure Reference	-100.0 to +100.0	12.0 Bar	Determined by refrigerant
P3-02	Condensing pressure OFF	5.0 to 50.0	8.0 Bar	Determined by refrigerant
P3-03	ON-Hysteresis	5.0 to 50.0	5.0 Bar	Determined by refrigerant
P3-04	P-Control	0.0 to 50.0	08.0	08.0
P3-05	I-Controller	0.0 to 50.0	12.0 s	12.0 s
P3-11	BASE BLOCK - Level	0.0 to 100.0	0.0 Bar	0.0 = OFF
P3-12	TRIP - Level	0.0 to 100.0	0.0 Bar	0.0 = OFF

Caution:

All settings are pre-programmed for a pressure transducer with the following data: 8-30V/DC;
Signal: 4-20mamps; Range: -0,8 to 7,0 Bar; Others can be adapted by modifying parameter P9-05/-06.

S22 Example Condensing pressure Control

Optional it is possible to use the GA500 series with a graphical display. A SD-memory-card could be used to monitor and store data of the GA500 and connected sensors. An integrated Real-Time-Clock ensures that all data are safely identified.



- User languages: German and English
- Displays modified Parameter in text form
- User defined displays
- Real-Time-Clock for fault analysis
- SD-Card slot for data export (CSV-format).
- Safes parameter settings in internal memory

Variable Speed Drive: Yaskawa GA500-Series

Technical Data

Type	Input			Output (3-Phase)				Mech. Data		
	Power	Fuse	Voltage	Cur - rent	I max for 60s	Power T=const.	Losses	Weight	Dimensions	EMC Filter Integrated
GA50C	in kVA	in A	in V	in A	in A	in kW	in W	in kg	B x H x T (mm)	In accordance with IEC61800-3 Category: C2
B001	0,4	6	230 1Ph	0,8	1,2	0,10	13	0,7	128x68x116	*Without internal EMC-Filter
B002	0,7	6	230 1Ph	1,6	2,4	0,25	19	0,7	128x68x116	
B004	1,5	10	230 1Ph	3,0	4,5	0,55	30	1,0	128x68x158	
B006	2,9	16	230 1Ph	5,0	7,5	1,10	46	1,8	128x108x183	
B010	3,7	20	230 1Ph	8,0	12,0	1,50	73	1,8	128x108x199	
B012	5,4	25	230 1Ph	11,0	16,5	2,20	96	2,7	128x140x202	
B018*	9,2	36	230 1Ph	17,6	23,5	4,00	151	2,9	128x170x180	
4001	0,9	6	400 3Ph	1,2	1,8	0,37	16	1,4	108x128x126	
4002	1,4	6	400 3Ph	1,8	2,7	0,75	21	1,5	108x128x144	
4004	2,6	10	400 3Ph	3,4	5,1	1,50	36	1,9	108x128x183	
4005	3,7	10	400 3Ph	4,8	7,2	2,20	46	1,9	108x128x199	
4007	4,3	16	400 3Ph	5,6	8,4	3,00	51	1,9	108x128x199	
4009	5,6	20	400 3Ph	7,3	11,0	4,00	69	1,9	108x128x199	
4012	7,0	25	400 3Ph	9,2	13,8	5,50	89	2,6	140x128x193	
4018	11,3	36	400 3Ph	14,8	22,2	7,50	178	3,9	140x260x196	
4023	13,7	36	400 3Ph	18,0	27,0	11,00	209	3,9	140x260x196	
4031	18,3	50	400 3Ph	24,0	36,0	15,00	264	5,5	180x300x196	
4038	23,6	63	400 3Ph	31,0	46,5	18,50	345	5,5	180x300x196	
4044	29,7	80	400 3Ph	39,0	58,5	22,00	457	8,0	190x350x251	
4060	34,3	100	400 3Ph	45,0	67,5	30,00	456	8,5	190x350x251	

General Technical data

	Name:	Specification:
Input	Input voltage Supply frequency	1Ph. 230V; 3-Ph. 400V -15% bis +10% 50/60Hz +/- 5%
Output	Output frequency Overload capacity	0,01 to 400Hz, Default: 30-60Hz 150% for 60s (HD)
Environment	Ambient temperature Humidity Storage temperature Altitude	-10°C to 50°C < 95%, non condensating -20°C to 60°C Max. 1000m, Power de-rating>1000m 1% per 100m altitude, max. 3000m
Miss:	Vibration Safetey standards IP-Rating	max. 5,9m/s ² UL508C; EN954-1 Kat.3 IEC/EN61508 SIL2 IP20 oder IP54 (>22kW)

Short description „Refrigeration-software“ **KSW7** - II

To be used for speed control of refrigeration compressors with a pressure transducer to measure and control the suction pressure. The GA500 series enables compressor control in a highly efficient way in the field of refrigeration technology with the result of energy savings.

Integrated functions in the **KSW7** developed for special use in the refrigeration business will achieve higher savings in comparison with standard solutions.

Less time for Installation and commissioning is an additional benefit.

Please consider the following aspects: The max. compressor current is less than the rated inverter current for heavy duty applications.