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ПРЕОБРАЗОВАТЕЛИ ЧАСТОТЫ

Технические характеристики на

HVAC400

HVAC400-xxx-xxA

SMARTDRIVE HVAC INVERTERS

PRODUCT DATA

GENERAL

The SmartDrive HVAC inverter is an easy-to-use solution for all Heating, Ventilation and Air Conditioning applications in which speed control of the motor can be applied. The software also offers extensive possibilities for stand-alone PID control and Pump and Fan Cascade control. The drive is suitable for induction and permanent magnet motors.

Main applications in HVAC:

- Pumps
- Fans
- Compressors

HARDWARE FEATURES

- **Compact size**
- **Multilanguage HMI with advanced commissioning display / keypad (parameter copy function)**
- **Increased cabling space**
- **Stress removal and 360° grounding possibility for cabling inside the unit – no need for cable glands**
- **Integrated RFI-filters for typical building installation**
- **Integrated DC Choke to comply with EN 61000-3-12**
- **Varnished printed circuit boards as standard to maximize reliability**
- **Wide input and output connection possibilities**
- **Several integrated field buses:**
  - **Ethernet(IP): BACnet IP, Modbus TCP/IP**
  - **RS485(MS/TP): BACnet MS/TP, Modbus RTU, N2**
- **Wide range of I/O expansion and field bus option boards**
- **Integrated real-time clock with battery back-up for timed functions and fault time stamps**
- **USB connection to PC with SMARTDRIVE-USBC cable**

SOFTWARE FEATURES

- **30s Start-Up Wizard**
- **Mini wizards: PID, cascade control, and resonance sweep wizards**
- **Very silent motor operation with high switching frequency**
- **Over-temperature ride-through**
- **Power ride-through**
- **Trip-free operation with maintenance/safety switch between the inverter and the motor**
- **Configurable auto-reset**
- **RTO – Ramp Time Optimizer**
- **PID controller with advanced functionality: sleep mode, pump soft fill, feed forward, pressure loss compensation, etc.**
- **Extra PID controller for controlling other devices**
- **Pump and Fan Cascade (PFC) controller with full auto-change functionality**

SPECIFICATIONS

Mains Connection

Input voltage U_{in}	380…480 Vac (-10…+10%), 3~
Input frequency	47…66 Hz
Connection to mains	Once per minute or less

Motor Connection

Output voltage	0 - U_{in}, 3~
Output current	I_N: Continuous output current with maximum +40 °C ambient temperature, overloadability 1.1 x I_N (1min/10min)
Output frequency	0…320 Hz
Frequency resolution	0.01 Hz

Control Characteristics

Control method	Frequency control U/f
Switching frequency	1.5...16 kHz; default 6 kHz (1.1-30 kW) default 4 kHz (37-160 kW)
Field weakening point	8…320 Hz
Acceleration time	0.1…3000 sec

Deceleration time 0.1…3000 sec

Ambient Conditions

Operating temperature -10 °C (no frost)…+40 °C ambient: rated loadability I_N (also higher ambient with derating)

Storage temperature -40…+70 °C

Air Quality

Tested according to: IEC 60068-2-60 Flowing mixed gas corrosion test, Method 1 (H_2S [hydrogen sulfide] and SO_2 [sulfur dioxide])

Designed according to: Chemical vapors: IEC 60721-3-3, unit in operation, class 3C2

Mechanical particles: IEC 60721-3-3, unit in operation, class 3S2

Altitude 100% load capacity (no derating) up to 1000 m

1% derating for each 100 m above 1000 m; max. 4500 m

Allowed voltage for I/O signals:

Up to 2000 m: max 240V

2000-4500 m: max 120V

Relative humidity 0…95% RH, non-condensing, non-corrosive, no dripping water

Mechanical vibration 5...150 Hz

EN 50178, EN 60068-2-6 Displacement amplitude 1 (peak) mm at 5...15.8 Hz

Max acceleration amplitude 1 G at 15.8...150 Hz

Mechanical shock UPS Drop Test (for applicable

EN 50178, IEC 68-2-27 UPS weights)

Storage and shipping: max 15 g, 11 ms (in package)

Enclosure class IP21 and IP54 models available

NOTE! IP54 fulfilled only when the HMI is in place

Electromagnetic Compatibility (EMC)

RFI Immunity EN 61800-3 1st and 2nd environment (industrial and public electrical networks)

RFI Emissions EN 61800-3 Category C2 (C1 with optional filter)

Harmonics emissions EN 61000-3-12

Safety

EN 61800-5-1 CE

UL508C UL, cUL

(See unit nameplate for more detailed approvals.)

Control Connections

Analog inputs 2 inputs as standard selection for mA or V with dip switches:

0(2)...+10 V (Ri = 200 kΩ)

0(4)…20 mA (Ri = 250 Ω)

Resolution 0.1%, accuracy ±1%, short-circuit protected

Digital inputs 6 inputs as standard with positive or negative logic:

0…5 V = “0”

15…30 V = “1”

Ri = min. 5 kΩ

Motor thermistor input R_{TRIP}=4.7 kΩ (PTC); measuring voltage 3.5V

Aux. DC-voltage input 24 Vdc, ±10%; can be used for power backup of the control unit

Analog output 1 output as standard selection for mA or V with dip-switches:

0(2)...+10 V

0(4)…20 mA

Load <500Ω, resolution 0,1%, accuracy ±2%, short-circuit protected

Digital outputs 2 programmable relay outputs (NO/NC) as standard.

Max. switching load: 24 Vdc / 8 A, 250 Vac / 8 A or 125 Vdc / 0.4 A

Min. switching load: 5 V / 10 mA

24V aux. voltage outputs 2 outputs: +24 Vdc, ±10%, max. load 250 mA, short-circuit protected

10V ref. voltage output +10 Vdc, +3%, max. load 10 mA

Protections

Overvoltage	911 Vdc (~675 Vac) in HVAC400
Undervoltage	Depends on supply voltage (0.8775*V_{IN}) 333 Vdc (~250 Vac) with 400 V V_{IN}
Overcurrent	Trip limit 4.0*I_N instantaneously
Earth-fault	YES
Inverter over temperature	YES
Input phase loss	YES
Output phase loss	YES
Motor overload	YES
Motor stall *(Fan/pump blocked)*	YES
Motor underload *(Pump dry / Belt broken detection)*	YES
Short-circuit of +24V and +10V ref. voltages	YES
Pump soft fill timeout	YES

PRODUCT IDENTIFICATION CODE

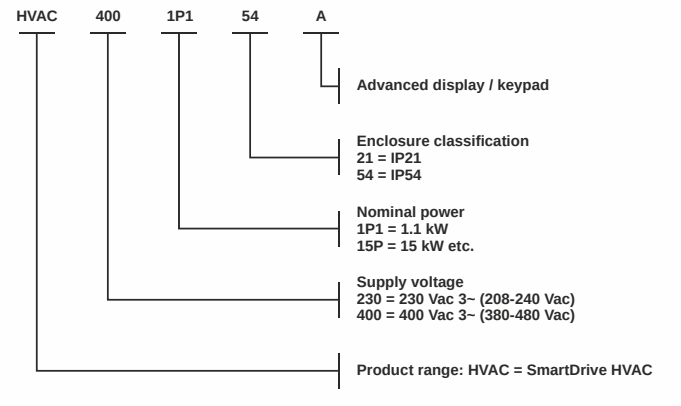

Fig. 1. Product Identification Code

MODELS

Mains voltage 400 V 3~ (380-480 V), 50/60 Hz							
Inverter type *)	Motor nominal shaft power 400V supply 40°C P[kW]	Loadability		Enclosure class	Mechanical size	Dimensions WxHxD [mm]	Weight [kg]
		Rated continuous current I_N [A]	10% overload current [A]				
HVAC400-**1P1**-xxA	**1.1**	3.4	3.7	IP21/54	MR4	128x328x190	6
HVAC400-**1P5**-xxA	**1.5**	4.8	5.3	IP21/54	MR4	128x328x190	6
HVAC400-**2P2**-xxA	**2.2**	5.6	6.2	IP21/54	MR4	128x328x190	6
HVAC400-**3P0**-xxA	**3.0**	8	8.8	IP21/54	MR4	128x328x190	6
HVAC400-**4P0**-xxA	**4.0**	9.6	10.6	IP21/54	MR4	128x328x190	6
HVAC400-**5P5**-xxA	**5.5**	12	13.2	IP21/54	MR4	128x328x190	6
HVAC400-**7P5**-xxA	**7.5**	16	1 6	IP21/54	MR5	144x419x214	10
HVAC400-**11P**-xxA	**11.0**	23	25.3	IP21/54	MR5	144x419x214	10
HVAC400-**15P**-xxA	**15.0**	31	34.1	IP21/54	MR5	144x419x214	10
HVAC400-**18P**-xxA	**18.5**	38	41.8	IP21/54	MR6	195x557x229	20
HVAC400-**22P**-xxA	**22.0**	46	50.6	IP21/54	MR6	195x557x229	20
HVAC400-**30P**-xxA	**30.0**	61	67.1	IP21/54	MR6	195x557x229	20
HVAC400-**37P**-xxA	**37.0**	72	79.2	IP21/54	MR7	237x660x259	37.5
HVAC400-**45P**-xxA	**45.0**	87	95.7	IP21/54	MR7	237x660x259	37.5
HVAC400-**55P**-xxA	**55.0**	105	115.5	IP21/54	MR7	237x660x259	37.5
HVAC400-**75P**-xxA	**75.0**	140	154.0	IP21/54	MR8	290x966x343	66
HVAC400-**90P**-xxA	**90.0**	170	187.0	IP21/54	MR8	290x966x343	66
HVAC400-**110**-xxA	**110**	205	225.5	IP21/54	MR8	290x966x343	66
HVAC400-**132**-xxA	**132**	261	287.1	IP21/54	MR9	480x1150x365	108
HVAC400-**160**-xxA	**160**	300	341.0	IP21/54	MR9	480x1150x365	108

*) xx in inverter type can be 21 for IP21 units and 54 for IP54 units. The sizes of both models are exactly the same.

MECHANICAL DIMENSIONS

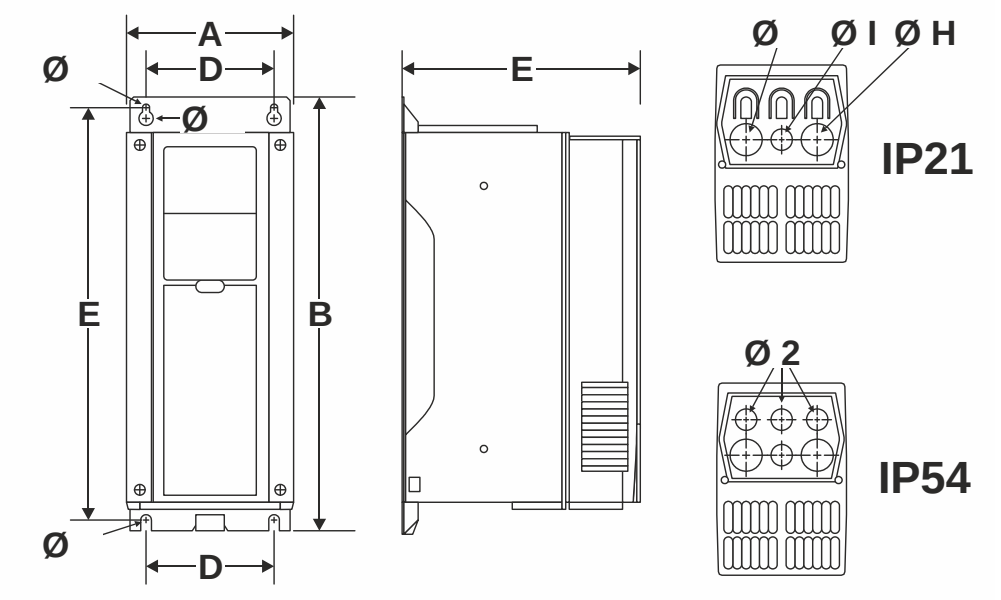

Fig. 3. Dimensions in millimeters

Mechanical size	Unit dimensions			Mounting hole distances		Hole sizes Ø			
	A	B	C	D	E	F	G	H	I
MR4	128	328	190	100	313	7	13	25	25
MR5	144	19	214	15 (*	406	7	14	33	25
MR6	195	557	229	148	541	9	16	40	33
MR7	237	660	259	190	645	9	16	50	50
MR8	290	966	343	217	947	9	16	60	60
MR9	480	1150	365	400	1122	9	16	60	60

(* Two mounting hole options: 100 mm also available for Honeywell NX_ replacements

See also RFI Filters for SmartDrive HVAC400 Inverters MR4, MR5, MR6 and MR7 – Product Data (EN0B-0705GE51) for further dimensions.

NOTE! All units have mounting holes equal to Honeywell NX_ products to ensure trouble-free replacement

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