

SINUS PENTA



BCH ELECTRIC LIMITED
we care for you

STANDARD FEATURES

4.5 KW - 3000 KW, 3 Phase 380 - 415 VAC

One product, 5 functions

- Vector modulation IFD functionality for general-purpose applications (V/f pattern)
- Sensorless vector VTC functionality for high torque-demanding applications (direct torque control)
- Vector FOC functionality with an encoder for accurate torque requirements and a wide speed range
- Vector SYN functionality for applications with brushless, synchronous motors with permanent magnets, requiring very accurate torque values and excellent energy performances
- RGN functionality for the inverter application as an AC/DC converter for the DC supply of multiple drives
- PC - compiled software for the programming of more than 20 application functions (in that case, an optional board is required)
- Integrated filters on the full range in compliance with EN61800-3 2nd ed. about RFI emission limits
- STO (Safety Torque Off) function with SIL2 safety level as defined in IEC61508:2000 and cat.3 as in EN95-1
- Compact dimensions
- Intelligent cooling system
- Integrated braking chopper up to 132KW (S30)
- Operating parameters saved to removable keypad module and possibility of parameter transfer to multiple inverters
- Lower motor noise with carrier frequency up to 16kHz (IFD and LIFT software)
- Motor PTC thermal probe control
- Easy commissioning with preset parameters for the most common applications
- Control keypad panel with 12 keys and large back-lit LCD
- Regulation of output frequency from 0 to 1000Hz
- In case of power failure, total control of the motor, down to 0 RPM
- Master-slave function for the operation of several motors connected to the same drive shaft (VTC and FOC)
- Automatic calibration (Auto Tuning) for motor parameters' acknowledgement
- 240% max torque
- PID function / second PID function
- Skip frequency
- Integrated digital potentiometer
- Integrated multifunctional tester
- Trip log
- Integrated motor thermal protection
- Automatic DC braking
- Programmable multiple acceleration and deceleration ramps
- Programmable logic blocks
- Encoder feedback
- 8 programmable inputs
- 3 programmable analog inputs 0-10 VDC, 0(4) - 20mA
- 2 programmable output relays with exchange contact
- 1 open collector output
- 1 digital Push-Pull output



- Auxiliary input frequency 5,000 - 65,000 Hz
- Auxiliary output frequency 5,000 - 65,000 Hz
- 3 programmable analog outputs 0 - 10 VDC, 0(4) - 20mA
- Auxiliary voltage 24VDC, 10VDC
- Serial communication RS485 with MODBUS RTU protocol upto 38.400 Baud
- Programmable S ramps

SPECIAL FEATURES

5-Function, all purpose inverter, up to 3000kW

- Enclosure IP00, IP20, IP54
- Available in stand-alone and cabinet solutions
- New control panel with 12 keys and large display
- Full compatibility with teleservice software, "REMOTE DRIVE" on internet
- Compatible with Easy Harmonics, tool for the calculation of Harmonic currents

OPTIONAL FEATURES

- Regenerative software
- "Remote Drive" software
- Braking module for sizes \geq S41 (132KW)
- Braking resistors
- Data logger card
- Digital / analog input / output expansion card
- Encoder card
- RS232/485 converter
- Kit remote keyboard operation (5 meters)
- Multi pump software
- Kit for heatsink segregation
- Converter for MODBUS/Profibus DP-CanBus-Device Net TCP / IP etc.

SPECIAL EXECUTIONS

- **12 impulse bridge** : Starting from the S65 size, it is possible to supply the drive on 12 impulse bridge configuration
- **Inverter in box IP54**
 - Wide power supply voltage range, 200VAC - 500VAC
 - Input frequency 50 - 60 Hz
 - Power range 1.3 - 90kW
 - Full compatibility with teleservice software "REMOTE DRIVE" on internet
- **Inverter in cabinet**
 - Power range 12.5 - 3000kW
 - Input frequency 50 - 60 Hz
 - Wide power supply voltage range, 200VAC - 690VAC
 - Full compatibility with teleservice software "REMOTE DRIVE" on internet





TECHNICAL SPECIFICATIONS

Power Range 380 - 500VAC

- 4.5 - 3000 kW
- 380 - 415VAC, 3 phase
- Degree of protection/size
- STAND ALONE : IP20 from Size S05 to Size S41, IP00 Size S51 & above.

Mains

- Wide power supply range - 380 to 500VAC, 3 phase, -15% +5%
- VDC supply voltage / tolerance 530 to 970VDC, -15% +5%
- Supply frequency (Hz) / tolerance 50, 60Hz, +/-10%.

Motor Specifications

- Motor voltage range/precision 0 to Vmains, +/-2%
- Current/torque suppliable to the motor/time 105 to 200% for 2 min. every 20 min. up to S30.
- 105 to 200% for 1 min. every 10 min. from S41.
- Starting torque 240% max for a short time
- Output frequency/resolution 0 to 1000Hz, resolution 0.01Hz
- Braking torque DC braking 30% *Cn
- Braking while decelerating up to 20% *Cn (with braking resistors 150%, *Cn)
- Adjustable carrier frequency with silent random modulation.

Environment requirements

- Ambient temperature: 0 to 45 C
- Storage temperature: -25 to +70 C
- Humidity: 5 to 95% (non condensing)
- Altitude: Upto 1000m above sea level
- Vibrations : Lower than 5.9m/sec² (=0.6G)

Installation environment

- Do not install in direct sunlight and in places exposed to conductive dust, corrosive gases, vibrations, water sprinkling or dripping (if not protected by an adequate degree of protection).
- Do not install in salty environments.
- Operating atmospheric pressure: 86 to 106kPa
- Cooling system: Forced air-cooling

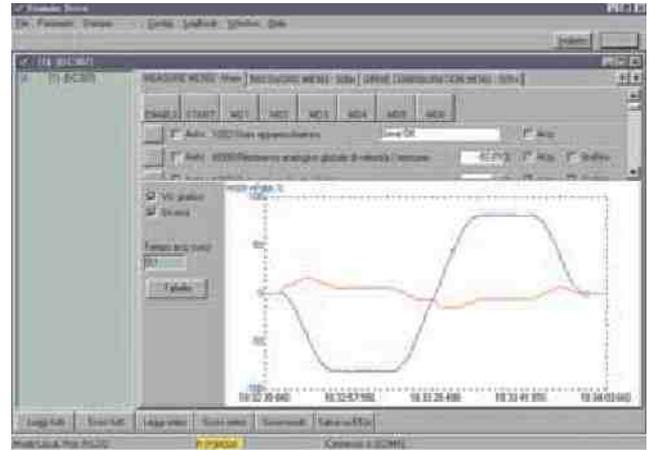
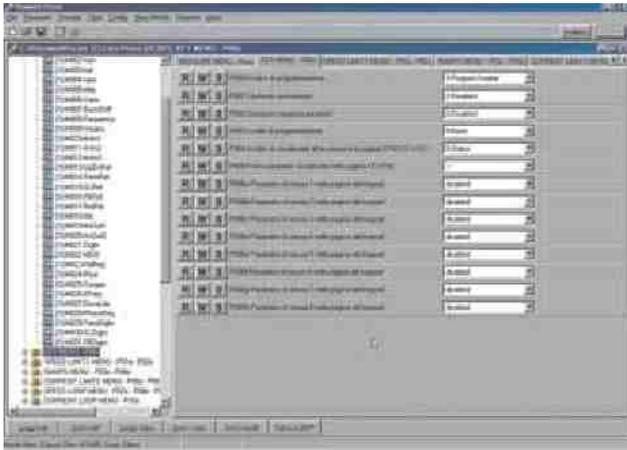
REMOTE DRIVE

Communication interface and management software

- A programming and diagnostics utility that works Windows, for all BCH Electric drives.

It offers the following tools:

- Data reception, transmission and saving, from a PC and onto a PC
- Keyboard emulator on the machine
- Parameters' programming and storing
- Parameters' print
- Graphic display of electric values
- Data logger
- Firmware update



Remote service

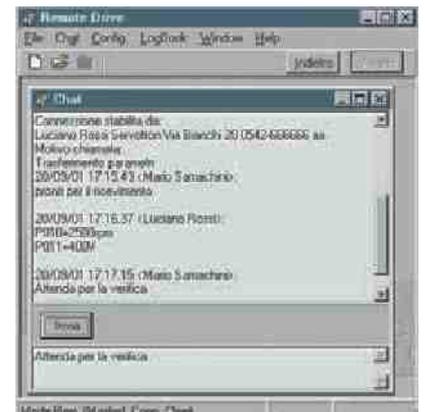
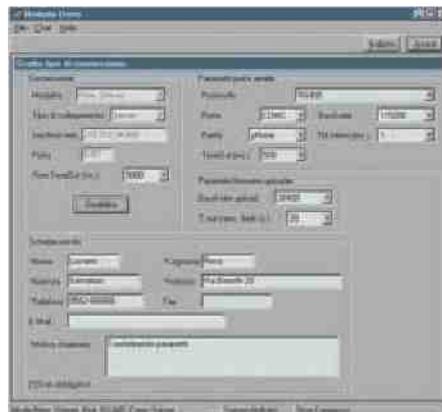
- A simple Internet connection allows Remote Drive to get our engineers onto your plants.
- Our drives can be reached all over the world, at the cost of a local telephone call
- Accurate and simple diagnostics upon the operating state of our drives
- Remote control
- Programming assisted by expert personnel
- Graphic display of the electric values
- In the page called "Connection Selection" (Choose the connection type), the following definitions are specified:
 Configuration of the remote connection
 Information data about the user
 Protocol and parameters of the PC serial port

Chat

- Software that assists the real-time communication between our engineers and the technicians on the field.



Param. Sigla	Valore	Param. Sigla	Valore	Param. Sigla	Valore
0001	0.0	0002	0.0	0003	0.0
0004	0.0	0005	0.0	0006	0.0
0007	0.0	0008	0.0	0009	0.0
0010	0.0	0011	0.0	0012	0.0
0013	0.0	0014	0.0	0015	0.0
0016	0.0	0017	0.0	0018	0.0
0019	0.0	0020	0.0	0021	0.0
0022	0.0	0023	0.0	0024	0.0
0025	0.0	0026	0.0	0027	0.0
0028	0.0	0029	0.0	0030	0.0
0031	0.0	0032	0.0	0033	0.0
0034	0.0	0035	0.0	0036	0.0
0037	0.0	0038	0.0	0039	0.0
0040	0.0	0041	0.0	0042	0.0
0043	0.0	0044	0.0	0045	0.0
0046	0.0	0047	0.0	0048	0.0
0049	0.0	0050	0.0	0051	0.0
0052	0.0	0053	0.0	0054	0.0
0055	0.0	0056	0.0	0057	0.0
0058	0.0	0059	0.0	0060	0.0
0061	0.0	0062	0.0	0063	0.0
0064	0.0	0065	0.0	0066	0.0
0067	0.0	0068	0.0	0069	0.0
0070	0.0	0071	0.0	0072	0.0
0073	0.0	0074	0.0	0075	0.0
0076	0.0	0077	0.0	0078	0.0
0079	0.0	0080	0.0	0081	0.0
0082	0.0	0083	0.0	0084	0.0
0085	0.0	0086	0.0	0087	0.0
0088	0.0	0089	0.0	0090	0.0
0091	0.0	0092	0.0	0093	0.0
0094	0.0	0095	0.0	0096	0.0
0097	0.0	0098	0.0	0099	0.0
0100	0.0	0101	0.0	0102	0.0
0103	0.0	0104	0.0	0105	0.0
0106	0.0	0107	0.0	0108	0.0
0109	0.0	0110	0.0	0111	0.0
0112	0.0	0113	0.0	0114	0.0
0115	0.0	0116	0.0	0117	0.0
0118	0.0	0119	0.0	0120	0.0
0121	0.0	0122	0.0	0123	0.0
0124	0.0	0125	0.0	0126	0.0
0127	0.0	0128	0.0	0129	0.0
0130	0.0	0131	0.0	0132	0.0
0133	0.0	0134	0.0	0135	0.0
0136	0.0	0137	0.0	0138	0.0
0139	0.0	0140	0.0	0141	0.0
0142	0.0	0143	0.0	0144	0.0
0145	0.0	0146	0.0	0147	0.0
0148	0.0	0149	0.0	0150	0.0
0151	0.0	0152	0.0	0153	0.0
0154	0.0	0155	0.0	0156	0.0
0157	0.0	0158	0.0	0159	0.0
0160	0.0	0161	0.0	0162	0.0
0163	0.0	0164	0.0	0165	0.0
0166	0.0	0167	0.0	0168	0.0
0169	0.0	0170	0.0	0171	0.0
0172	0.0	0173	0.0	0174	0.0
0175	0.0	0176	0.0	0177	0.0
0178	0.0	0179	0.0	0180	0.0
0181	0.0	0182	0.0	0183	0.0
0184	0.0	0185	0.0	0186	0.0
0187	0.0	0188	0.0	0189	0.0
0190	0.0	0191	0.0	0192	0.0
0193	0.0	0194	0.0	0195	0.0
0196	0.0	0197	0.0	0198	0.0
0199	0.0	0200	0.0	0201	0.0
0202	0.0	0203	0.0	0204	0.0
0205	0.0	0206	0.0	0207	0.0
0208	0.0	0209	0.0	0210	0.0
0211	0.0	0212	0.0	0213	0.0
0214	0.0	0215	0.0	0216	0.0
0217	0.0	0218	0.0	0219	0.0
0220	0.0	0221	0.0	0222	0.0
0223	0.0	0224	0.0	0225	0.0
0226	0.0	0227	0.0	0228	0.0
0229	0.0	0230	0.0	0231	0.0
0232	0.0	0233	0.0	0234	0.0
0235	0.0	0236	0.0	0237	0.0
0238	0.0	0239	0.0	0240	0.0
0241	0.0	0242	0.0	0243	0.0
0244	0.0	0245	0.0	0246	0.0
0247	0.0	0248	0.0	0249	0.0
0250	0.0	0251	0.0	0252	0.0
0253	0.0	0254	0.0	0255	0.0
0256	0.0	0257	0.0	0258	0.0
0259	0.0	0260	0.0	0261	0.0
0262	0.0	0263	0.0	0264	0.0
0265	0.0	0266	0.0	0267	0.0
0268	0.0	0269	0.0	0270	0.0
0271	0.0	0272	0.0	0273	0.0
0274	0.0	0275	0.0	0276	0.0
0277	0.0	0278	0.0	0279	0.0
0280	0.0	0281	0.0	0282	0.0
0283	0.0	0284	0.0	0285	0.0
0286	0.0	0287	0.0	0288	0.0
0289	0.0	0290	0.0	0291	0.0
0292	0.0	0293	0.0	0294	0.0
0295	0.0	0296	0.0	0297	0.0
0298	0.0	0299	0.0	0300	0.0





DRIVE RATING AND OVERLOAD SELECTION TABLE

Frame Size	Drive Model	Inom (A)	Imax (A)	Ipeak (A)	LIGHT			STANDARD			HEAVY			STRONG		
					Overload up to 120%			Overload up to 140%			Overload up to 175%			Overload up to 200%		
					Motor power 380 - 415 VAC			Motor power 380 - 415 VAC			Motor power 380 - 415 VAC			Motor power 380 - 415 VAC		
					kW	HP	A	kW	HP	A	kW	HP	A	kW	HP	A
S05	SINUS P 0005	10.5	11.5	14	4.5	6	9	4	5.5	8.4	3	4	6.4	2.2	3	4.9
	SINUS P 0007	12.5	13.5	16	5.5	7.5	11.2	4.5	6	9.0	4	5.5	8.4	3	4	6.4
	SINUS P 0009	16.5	17.5	19	7.5	10	14.5	5.5	7.5	11.2	4.5	6	9	4	5.5	8.4
	SINUS P 0011	16.5	21	25	7.5	10	14.8	7.5	10	14.8	5.5	7.5	11.2	4.5	6	9
	SINUS P 0014	16.5	25	30	7.5	10	14.8	7.5	10	14.8	7.5	10	14.8	5.5	7.5	11.2
S12	SINUS P 0016	27	30	36	11	15	21	9	12.5	18	9	12.5	18	7.5	10	15
	SINUS P 0017	30	32	37	15	20	29	11	15	21	9	12.5	18	7.5	10	15
	SINUS P 0020	30	36	43	15	20	29	15	20	29	11	15	21	9.2	12.5	18
	SINUS P 0025	41	48	58	22	30	41	18.5	25	35	15	20	29	11	15	21
	SINUS P 0030	41	56	67	22	30	41	22	30	41	18.5	25	35	15	20	29
	SINUS P 0034	57	63	76	30	40	55	25	35	46	22	30	41	18.5	25	35
	SINUS P 0036	60	72	86	30	40	55	30	40	55	25	35	46	22	30	41
S15	SINUS P 0040	72	80	88	37	50	67	30	40	55	25	35	46	22	30	41
	SINUS P 0049	80	96	115	45	60	80	37	50	67	30	40	55	25	35	46
S20	SINUS P 0060	88	112	134	50	70	87	45	60	80	37	50	67	30	40	55
	SINUS P 0067	103	118	142	55	75	98	55	75	98	45	60	80	32	45	59
	SINUS P 0074	120	144	173	65	90	114	65	90	114	50	70	87	37	50	67
	SINUS P 0086	135	155	186	75	100	133	75	100	133	55	75	98	45	60	80
S30	SINUS P 0113	180	200	240	100	135	180	90	125	159	75	100	133	55	75	98
	SINUS P 0129	195	215	258	110	150	191	100	135	180	80	110	144	65	90	114
	SINUS P 0150	215	270	324	120	165	212	110	150	191	90	125	159	75	100	133
	SINUS P 0162	240	290	324	132	180	228	132	180	228	110	150	191	90	125	159
S41	SINUS P 0180	300	340	408	160	220	273	150	200	264	132	180	228	110	150	191
	SINUS P 0202	345	420	504	200	270	341	160	220	273	160	220	273	132	180	228
	SINUS P 0217	375	460	552	220	300	375	220	270	375	185	250	321	150	200	260
	SINUS P 0260	425	560	672	250	340	425	250	340	425	220	300	375	185	250	321
S51	SINUS P 0313	480	600	720	280	380	480	280	380	480	250	340	421	200	270	341
	SINUS P 0367	550	680	792	315	430	528	315	430	528	280	380	480	220	300	375
	SINUS P 0402	680	850	1020	400	550	680	400	550	680	355	485	589	280	380	480

Inom - Inverter nominal current
 Imax - Inverter maximum current for 120sec every 20min till S31 and 60 sec every 10 min S41 and above
 Ipeak - Inverter maximum current for 3 sec

CONTROL AND POWER TERMINAL DETAILS

Screwable terminal board in six extractable sections suitable for cross-section $0.08 \div 1.5\text{mm}^2$ (AWG 28 - 16)

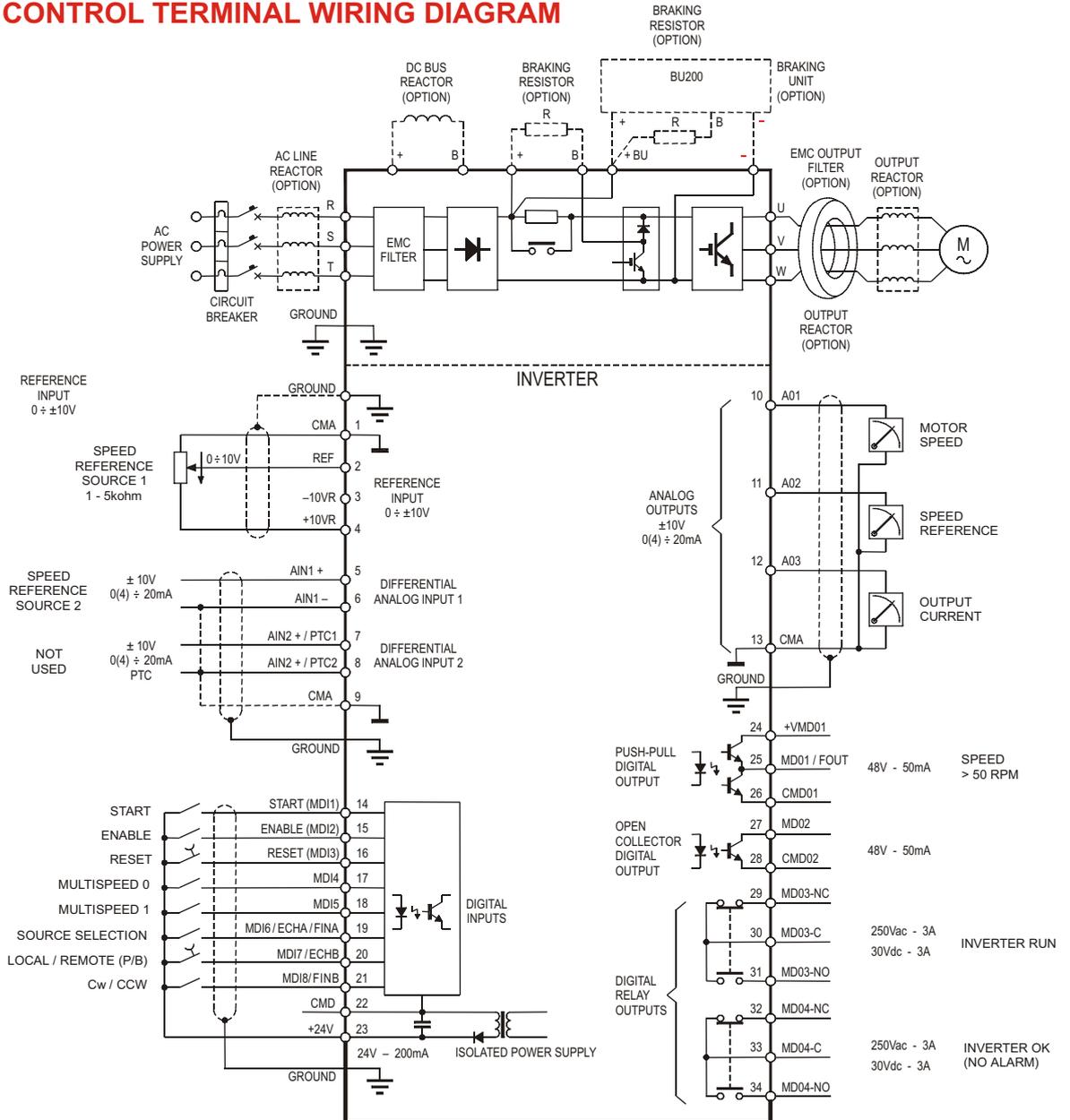
No.	Name	Description	I/O Features	DIP Switch
1	CMA	0V for main reference (connected to control 0V)	Control board zero volt	
2	REF	Input for single-ended main reference to be configured either as a voltage input or a current input	Vfs = $\pm 10\text{V}$, Rin: 50k Ω ; Resolution : 12 bits	SW1-1: Off
			0 (4) \div 20 mA, Rin = 250 Ω ; Resolution : 11 bit	SW1-1: On
3	-10VR	Negative reference supply output for external potentiometer	-10V Imax : 10mA	SW1-1: Off
4	+10VR	Positive reference supply output for external potentiometer	+10V Imax : 10mA	SW1-1: Off
5	AIN1+	Differential auxiliary analog input 1 to be configured either as a voltage input or as a current input	Vfs = $\pm 10\text{V}$, Rin: 50k Ω ; Resolution : 12 bits	SW1-2: Off
6	AIN1-		0 (4) \div 20 mA, Rin = 250 Ω ; Resolution: 11 bit	SW1-2: On
7	AIN2+/ PTC1	Differential auxiliary analog input to be configured either as a voltage input or as a current input, or to be configured as a PTC acquisition input for motor protection	Vfs = $\pm 10\text{V}$, Rin: 50k Ω ; Resolution : 12 bits	SW1-3: Off SW1-4, 5: Off
8	AIN2+/ PTC2		0 (4) \div 20 mA, Rin = 250 Ω ; Resolution : 11 bit	SW1-3: On SW1-4, 5: On
			Motor protection PTC reading according to DIN44081/DIN44082	SW1-3: Off SW1-4, 5: On
9	CMA	0V for main reference (connected to control 0V)		
10	AO1	Analog output 1 to be configured either as a voltage output or as a current output	Vout = $\pm 10\text{V}$; Ioutmax = 5 mA Resolution 11 bit	SW2-1: On SW2-2: Off
			0 (4) \div 20 mA; Voutmax = 10V Resolution 10 bit	SW2-1: Off SW2-2: On
11	AO2	Analog output 2 to be configured either as a voltage output or as a current output	Vout = $\pm 10\text{V}$; Ioutmax = 5 mA Resolution 11 bit	SW2-3: On SW2-4: Off
			0 (4) \div 20 mA; Voutmax = 10V Resolution 10 bit	SW2-3: Off SW2-4: On
12	AO3	Analog output 3 to be configured either as a voltage output or as a current output	Vout = $\pm 10\text{V}$; Ioutmax = 5 mA Resolution 11 bit	SW2-5: On SW2-6: Off
			0 (4) \div 20 mA; Voutmax = 10V Resolution 10 bit	SW2-5: Off SW2-6: On
13	CMA	0V for main reference (connected to control 0V)		
14	START (MDI1)	Active input: inverter running. Inactive input: main ref. is reset and the motor stops with a deceleration ramp	Optoisolated digital inputs 24 VDC; positive logic (PNP): active with greater signal with respect to CMD (terminal 22). In compliance with EN 61131-2 as type-1 digital inputs with rated voltage equal to 24 VDC. Max response time to processor 500 μs	
15	ENABLE (MDI2)	Active input: inverter running enabled. Inactive input: motor idling regardless of control mode; inverter not commutating		
16	RESET (MDI3)	Alarm reset function. Multifunction digital input 3		
17	MDI4	Multifunction digital input 4		
18	MDI5	Multifunction digital input 5		
19	MDI6 / ECHA / FINA	Multifunction digital input 6; Encoder dedicated input, push-pull 24 V single-ended phase A, frequency input A	Optoisolated digital inputs 24 VDC; positive logic (PNP): active with greater signal with respect to CMD (terminal 22). In compliance with EN 61131-2 as type-1 digital inputs with rated voltage equal to 24 VDC. Max response time to processor 600 μs	
20	MDI7 / ECHB	Multifunction digital input 7; Encoder dedicated input, push-pull 24 V single-ended, phase B		
21	MDI8 / FINB	Multifunction digital input 8; Frequency dedicated input B		
22	CMD	0V digital input isolated to control 0V	Optoisolated digital input zero volt	
23	+24V	Auxiliary supply output for optoisolated multifunction digital inputs	+24V $\pm 15\%$; Imax: 200 mA Protect with resetting fuse	
24	+VMDO1	Supply input for MDO1 output	20 \div 48 VDC; IDC = 10 mA + output current (max 60 mA)	
25	MDO1 / FOUT	Multifunction digital output 1; frequency output	Optoisolated digital output (push-pull); Iout = 50 mA max; fout max 100 kHz	
26	CMDO1	0V Multifunction digital output 1	Common for supply and MDO1 output	

No.	Name	Description	I/O Features	DIP Switch
27	MDO2	Multifunction digital output 2	Isolated digital output (open collector); Vomax = 48 V; Iomax = 50 mA	
28	CMDO2	Common for multifunction digital output 2	Common for multifunction output 2	

Screwable terminal board in two extractable sections suitable for cross-section $0.2 \div 2.5\text{mm}^2$ (AWG 24 - 12)

No.	Name	Description	I/O Features	DIP Switch
29	MDO3-NC	Multifunction, relay digital output 3 (NC contact)	Reverse contact: with low logic level, common terminal is closed with NC terminal; with high logic level, common terminal is open with NO; Vomax = 250 VAC, Iomax = 3A Vomax = 30 VDC, Iomax = 3A	
30	MDO3-C	Multifunction, relay digital output 3 (common)		
31	MDO3-NO	Multifunction, relay digital output 3 (NO contact)		
32	MDO4-NC	Multifunction, relay digital output 4 (NC contact)		
33	MDO4-C	Multifunction, relay digital output 4 (common)		
34	MDO4-NO	Multifunction, relay digital output 4 (NO contact)		

POWER AND CONTROL TERMINAL WIRING DIAGRAM



DATA SHEET

MOTOR CONTROL	Motor control methods	IFD = Voltage/Frequency with symmetrical PWM modulation VTC = Vector Torque Control (Sensorless vectorial, direct torque control) FOC = Field adjustment with field regulation and torque for synchronous motors SYN = Field adjustment with torque control for synchronous motors	
	Frequency / speed setting resolution	Digital reference ; 0.1 Hz (IFD SW); 1 rpm (VTC SW); 0.01 rpm (FOC SW) 12 bits Analog reference	
	Speed precision	Open loop : 2% of max. speed Closed loop (with an encoder); < 0.5% of max. speed	
	Overload capacity	Up to 2 times rated current for 120 sec.	
	Starting torque	Up to 200% Cn for 120 sec and 240% Cn for a short duration	
	Torque boost	Programmable for a rated torque increase	
OPERATION	Input signals	Operation method	Operation through terminal board, keypad, MODBUS RTU serial interface, field bus interface
		Reference analog inputs / auxiliary inputs	3 analog inputs to be configured as voltage/current inputs : - 1 single-ended input, max. resolution 12 bits - 2 differential inputs, max resolution 12 bits Analog quantities from keypad, serial interface, field bus
		Digital inputs	8 digital inputs; 3 fixed inputs (ENABLE, START, RESET) and 5 configurable inputs
		Multispeed	15 sets of programmable speed values +/-32,000 rpm of which the first 3 sets with resolution 0.01 rpm (Method FOC and SYN)
		Ramps	4 + 4 accel./decel. amps, 0 to 6,500 sec; possibility to set user-defined patterns.
	Output signals	Digital outputs	4 configurable digital outputs with possibility to set internal timers for activation/deactivation delay: 1 push-pull output 20÷48 Vdc, 50 mA max. 1 open collector NPN/PNP output, 5÷48 Vdc, 50 mA max 2 relay outputs with reverse contacts 250 VAC, 30 VDC, 3A
		Auxiliary voltage	24 Vdc +/-5%, 200 mA
		Reference voltage for potentiometer	+ 10 Vdc ± 0.8%, 10 mA - 10 Vdc ± 0.8%, 10 mA
		Analog outputs	3 configurable analog outputs, - 10 ÷ 10 Vdc, 0 ÷ 10 Vdc, 0(4) ÷ 20 mA, resolution 9/11 bits
	PROTECTIONS	Alarms	Inverter thermal protection, motor thermal protection, mains failure, overvoltage, undervoltage, overcurrent at constant speed or ground failure, overcurrent while accelerating, overcurrent while decelerating, overcurrent during speed search (IFD SW only), auxiliary trip from digital input, serial communication failure, control board failure, precharge circuit failure, inverter overload conditions for long duration, unconnected motor, encoder failure, overspeed.
Warning		INVERTER OK, INVERTER ALARM, acceleration - constant rpm - deceleration, current/torque limiting, POWER DOWN, SPEED SEARCHING, DC braking, autotuning.	
COMMUNICATION DISPLAY	Operating data	Frequency/torque/speed reference, output frequency, motor speed, required torque, generated torque, current to motor, voltage to motor, DC bus voltage, motor power, digital input condition, digital output condition, trip log (last 8 alarms), operating time, auxiliary analog input value, PID reference, PID feedback, PID error value, PID regulator output, PID feedback with programmable multiplying factor.	
	Serial link	Standard incorporated RS485 multidrop 247 drops MODBUS RTU communication protocol	
	Field bus	Profibus DP; Can Bus; Device Net; Ethernet; with optional internal board	
SAFETY REQUIREMENTS		EN 61800-5-1, EN50178, EN60204-1, IEC 22G/109/NP	
Marking	   		

PRODUCT SELECTION

The SINUS's rating performances can be different according to the admitted rated current and overload (look at overload selection table for LIGHT, STANDARD, HEAVY and STRONG loads). Every single model of inverter can be applied to 4 different sizes of motor power according to the ratings required by the load.

SINUS	P	0005	4	T	B	A2	X	2	Control mode PENTA = 5 built-in software (see tech. specs.)	Power Supply T = 3 Phase C = direct current supply D = 12 impulse bridge	Braking Chopper X = no B = integrated	Enclosure 0 = IP00 2 = IP20 3 = IP24 / IP31 4 = IP42 5 = IP54 C = conditioner S = air-water exchanger
									Product line SINUS SINUS BOX SINUS CABINET	Inverter Size	Power Supply 2 = 200 - 240Vac; 280 - 340Vdc 4 = 380 - 500Vac; 530 - 705Vdc 5 = 500 - 600Vac; 705 - 845Vdc 6 = 600 - 690Vac; 845 - 970Vdc	Keypad X = no K = integrated

EMC Filter
I = no filters
A1 = EN55011 gr.1 cl.A
 Integrated filters for industrial and domestic users
A2 = EN55011 gr.2 cl.A
 Integrate filters for industrial users
B = EN55011 gr.1 cl.B
 Integrate type A1 filter and output ferrite ring for industrial and domestic users

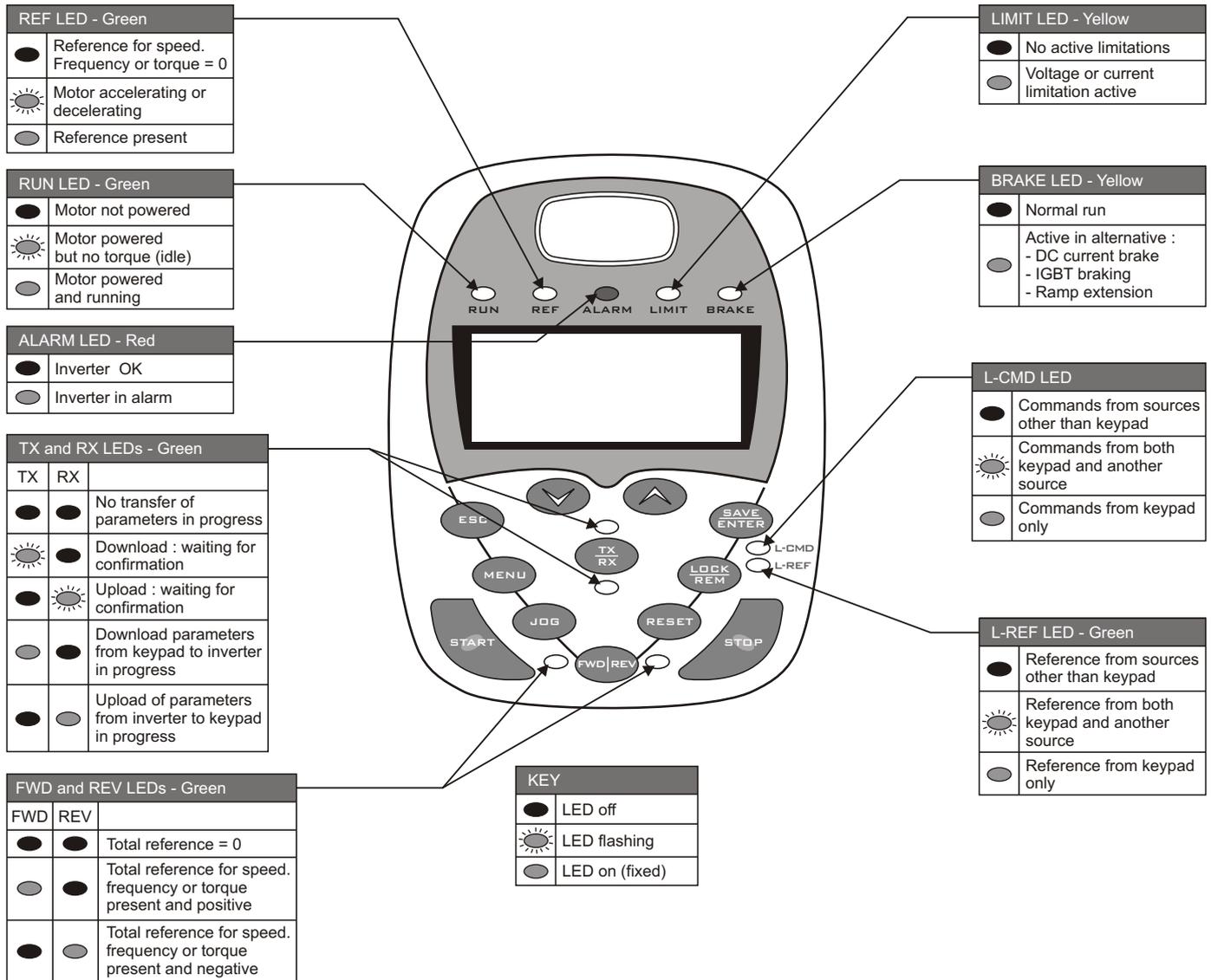
DIMENSION & WEIGHT



Dimensions & weight models 4T

Size	L (mm)	H (mm)	D (mm)	Weight (kg)
S05	170	340	175	7
S12	215	401	225	12.5
S15	225	466	331	22.5
S20	279	610	332	36
S30	302	748	421	51
S41	500	882	409	121
S51	578	882	409	141
S60	890	1310	530	260
S65	980	1400	560	440

OPERATING AND REMOTING KEY PAD



APPLICATIONS

The SINUS Penta Inverters are easily adaptable to the Customer's requirements due to the several software functions integrated on every drive. They can be used, for instance, on cranes and bridge cranes, paper and plastic machines, metallic thread and metallic sheet manufacture, textile, tools, compressors, conveyor belts, mixers, mills, pumps, fans, etc.

Hoists and cranes lifting

The sw VTC SINUS Penta integrates specific functions for the lifting systems' control. With the help of anti-falling integrated function, it is possible to check with total safety the suspended loads' handling, without using of the closed loop(no encoder). This function manages mechanical brake opening and closing under all operating conditions, thus assuring the immediate block of the lifted load in case of excessive overload weights and/or anomalies of the system.



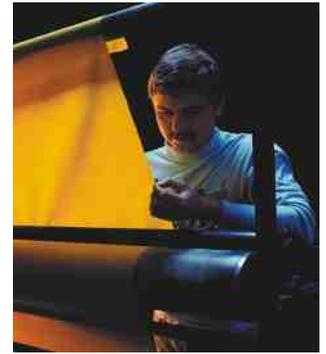
Hoists and cranes' traslation

The sw IFD SINUS Penta is able to drive a certain number of motors in parallel for the traction control of both bridge and trolley of cranes and bridge cranes. With the high overload capacity and automatic control of the mechanical brake opening and closing, the sw IFD SINUS Penta can be used in every sector, from the iron and the industrial ones up to the cranes for the building industry.

Winding and rewinding machines

The SINUS Penta integrates some functions for the winding and rewinding machines' control :

- configurable PID in all applications where a feedback speed control is required from a position sensor (dancer) complete with material breaking function;
- External TORQUE and/or TORQUE/SPEED control in the applications where a pull control is required (sw VTC only)



Textile

The function "power down in case of main loss", broadly tested on spinning and twisting machines, makes the sw VTC SINUS Penta an essential product in textile sector. Moreover, the whole series of inverters offers the possibility to connect a certain number of devices in parallel on the DC BUS (including brushless drives) so that it is possible to keep the function active also on multi-motor machines.



Pumping and ventilation

The SINUS Penta is equipped with a specific SW for the control of pumping and ventilation applications. With the integrated PID function, it is possible to check the pressure in a totally safe way or any other quantity in a completely automatic way. This function controls up to 3 motors with a single drive, precisely modulating the motor speed controlled by the inverter and activating both start and stop of other motors through digital outputs according to the application's requirements.



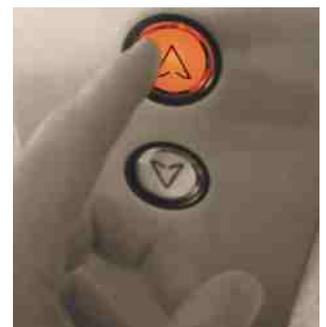
Centrifugal machines

The function of "speed search in case of main loss", broadly tested in the centrifuges of sugar, milk, oil, textiles' drying, makes the sw IFD SINUS Penta an essential product in all these applications. With sw IFD SINUS Penta, it is no more necessary in case of main loss or system anomaly to wait too much (productivity missed) for the machines' restart. This function allows the inverter to seek the motor rotation speed and take back the machine control in a soft immediate way.

Elevators

The sw LIFT SINUS Penta is the ideal solution to plan an elevator or renew and update an existing system with a traction control for rope elevators to be placed on the top of movement expectations, noiseless and cost effective operation.

The sw LIFT SINUS Penta gives the application an excellent precision, positioning and run comfort to program 2 levels of commercial speed +1 of floor approach, acceleration and jerk. The display of sw LIFT SINUS Penta will indicate the theoretical deceleration spaces, for a correct positioning of deceleration signals on the lift-shaft.



- Switchgear & Controlgear
- Automation
- Enclosures
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- Wires & Cables
- Reactive Power Management
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Since product improvement is a continuous process, the data furnished in this brochure may undergo revision without prior notice.