Typical Configurations
SD45COT0001BI

Most used Configurations with Variables Speed Drives of SDRIVE 450 series

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1. INTRODUCTION

Caution: The following instructions are based on the fact of all parameters are set to the factory default values. Results may be different if parameter values are modified. In this case, initialize the values of all parameters to return to the default values and follow the instructions below.

2. COMMONLY USED CONFIGURATIONS

2.1. Start /Stop Command and Speed Reference by Keypad or Analogue Input

2.1.1. Parameters Configuration

Parameter	Description	Display	Value
DRV-00	Reference frequency	0.00	50Hz
DRV-01	Acceleration time	Acc. Time	30.0sec
DRV-02	Deceleration time	Dec. Time	30.0sec
DRV-03	Start /Stop control mode	Drive mode	**Keypad:** Start / Stop by keypad. **Fx/Rx-1:** Start / Stop by terminals. **Int. 485:** Start /Stop through communication bus.
DRV-04	Frequency control mode	Freq mode	**Keypad – 1, Keypad – 2:** Frequency setting by keypad. **V1:** Potentiometer connected to the terminals V+, V1 and 5G. **V1S:** Potentiometer connected to the terminals V+, V1 and V-. **I:** 4-20mA / 0-20mA analogue input, terminals I and 5G. **Pulse:** Analogue pulse input, terminals A0 and B0. **Int. 485:** Reference frequency setting through communication bus.
FU1-23	Stop mode	Stop mode	**Decel:** Deceleration controlled by parameter DRV-02. **DC brake:** Inverter will stop by a DC current injection. **Free run:** Deceleration not controlled. Stop by inertia. **Fluxe brake:** Fast stop using the energy regenerated to heat into the motor. (CAUTION WITH THIS OPTION).
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base Freq	50Hz – At that frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,1Hz – Minimum speed at the starting.
FU1-33	Frequency limits selection	Freq limit	No: Limits are set in parameters FU1-30 and FU1-32. Yes: Limits are set in parameters FU1-34 and FU1-35.
FU1-34	Low frequency limit	F-limit Lo	0.00Hz
FU1-35	High frequency limit	F-limit Hi	50.00Hz
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 are available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-81	Delay time at the starting	Run Delay T	Delay time at the starting (optional).

Parameter	Description	Display	Value
FU2-20	Restart after power supply fault	Power-on run	No: Inverter will not restart after losing power supply and recovering it again. Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-48	Carrier frequency	Carrier freq	2.0 kHz
FU2-60	Control mode	Control mode	V/F control.
FU2-67	Torque boost setting	Torque boost	Manual
FU2-93	Parameters initialize	Para. Init	**All groups**: All of parameters are initialized with the factory settings.
I/O-01	Filter of analogue voltage input V1	V1 Filter	250ms (Filter of the analogue voltage input)
I/O-02	Minimum voltage of V1 input	V1 volt x1	0.00V (Minimum voltage of V1 input)
I/O-03	Frequency for minimum voltage of V1	V1 Freq y1	0Hz (Frequency for the minimum voltage of V1 input)
I/O-04	Maximum voltage of V1 input	V1 volt x2	10.0V (Maximum voltage of V1 input)
I/O-05	Frequency for maximum voltage of V1	V1 Freq y2	50Hz (Frequency for the maximum voltage of V1 input)
I/O-06	Filter of analogue current input I	I Filter	250ms (Filter of the analogue current input)
I/O-07	Minimum current of I input	I curr x1	4.00mA (Minimum current of I input)
I/O-08	Frequency for minimum current of I	I Freq y1	0Hz (Frequency for the minimum current of I input)
I/O-09	Maximum current of I input	I curr x2	20.00mA (Maximum current of I input)
I/O-10	Frequency for maximum current of I	I Freq y2	50Hz (Frequency for the maximum current of I input)

4   TYPICAL CONFIGURATIONS

2.1.2. Connections Drawing

Terminals CM / M7: start command (NO status).
Terminals I / 5G: 4-20mA analogue input.
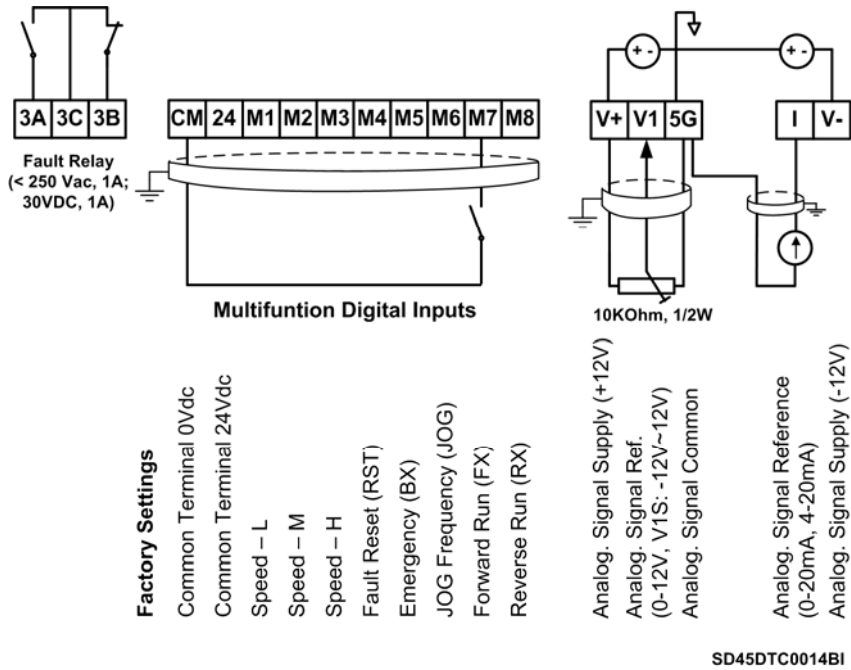Terminals VR / V1 / 5G: 0-10 V analogue input.

Figure 2.1. Start / Stop command and speed reference by keypad or analogue input

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW.

2.2. Multi-speed References via M1, M2 and M3 Terminals

2.2.1. Parameters Configuration

| Parameter	Description	Display	Value
DRV-00	Reference frequency	0.00	50Hz
DRV-01	Acceleration time	Acc. Time	10.0sec
DRV-02	Deceleration time	Dec. Time	10.0sec
DRV-03	Start / Stop Control mode	Drive mode	Keypad: Start / Stop by keypad. Fx/Rx-1: Start / Stop by terminals. Int. 485: Start / Stop through communication bus.
DRV-04	Frequency control mode	Freq mode	Keypad – 1, Keypad – 2: Frequency setting by keypad. V1: Potentiometer connected to the terminals V+, V1 and 5G. V1S: Potentiometer connected to the terminals V+, V1 and V-. I: 4-20mA / 0-20mA analogue input, terminals I and 5G. Pulse: Analogue pulse input, terminals A0 and B0. Int. 485: Reference frequency setting through communication bus.
DRV-05	Step frequency 1	Step Freq-1	30.00Hz (Multi-speed 1)
DRV-06	Step frequency 2	Step Freq-2	35.00Hz (Multi-speed 2)
DRV-07	Step frequency 3	Step Freq-3	40.00Hz (Multi-speed 3)
FU1-23	Stop mode	Stop mode	Decel: Deceleration controlled by parameter DRV-02. DC brake: Inverter will stop by a DC current injection. Free run: Deceleration not controlled. Stop by inertia. Fluxe brake: Fast stop using the energy regenerated to heat into the motor. (CAUTION WITH THIS OPTION).
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base Freq	50Hz – At this frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,1Hz – Minimum speed at the starting.
FU1-33	Frequency limits selection	Freq limit	No: Limits are set in parameters FU1-30 and FU1-32. Yes: Limits are set in parameters FU1-34 and FU1-35 .
FU1-34	Low frequency limit	F-limit Lo	0.00Hz
FU1-35	High frequency limit	F-limit Hi	50.00Hz
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-81	Delay time at the starting	Run Delay T	Delay time at the starting (optional).
FU2-20	Restart after power supply fault	Power-on run	No: Inverter will not restart after losing power supply and recovering it again. Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-48	Carrier frequency	Carrier freq	2.0 kHz

Parameter	Description	Display	Value
FU2-60	Control mode	Control mode	V/F control.
FU2-67	Torque boost setting	Torque boost	Manual
I/O-20	Configuration of M1 terminal	M1 define	Speed-L (Multi-speed 1)
I/O-21	Configuration of M2 terminal	M2 define	Speed-M (Multi-speed 2)
I/O-22	Configuration of M3 terminal	M3 define	Speed-H (Multi-speed 3)
I/O-31	Step frequency 4	Step Freq-4	45.00Hz (Multi-speed 4)
I/O-32	Step frequency 5	Step Freq-5	50.00Hz (Multi-speed 5)
I/O-33	Step frequency 6	Step Freq-6	47.00Hz (Multi-speed 6)
I/O-34	Step frequency 7	Step Freq-7	42.00Hz (Multi-speed 7)

Depending on the status of the input terminals M1, M2 and M3, different programmed frequencies can be selected:

Programmed frequency	Parameter	Speed-H (M3)	Speed-M (M2)	Speed-L (M1)
50.00Hz	DRV-00	0	0	0
30.00Hz	DRV-05	0	0	1
35.00Hz	DRV-06	0	1	0
40.00Hz	DRV-07	0	1	1
45.00Hz	I/O-31	1	0	0
50.00Hz	I/O-32	1	0	1
47.00Hz	I/O-33	1	1	0
42.00Hz	I/O-34	1	1	1

2.2.2. Connections Drawing

Terminals CM / M7: start command (NO status).
Terminals CM / M1: Multi-reference Speed-L (NO status).
Terminals CM / M2: Multi-reference Speed-M (NO status).
Terminals CM / M3: Multi-reference Speed-H (NO status).
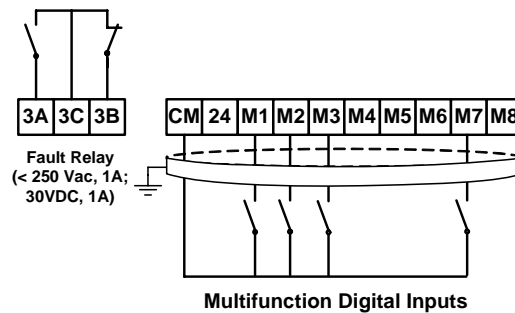
Figure 2.2. Multi-speed references via M1, M2 and M3 terminals

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW.

2.3. Control of one Pump, Eight Speed References and Manual Speed (Under-load) Without Pressure Group Functionality

2.3.1. Parameters Configuration

Parameter	Description	Display	Value
DRV-00	Pressure reference REF1	0.00	40.00% (20Hz) (Pressure reference, 20Hz x 2 =40% transducer range.)
DRV-00R	Reference and feedback values of PID	R 0.0% F 0.0%	R = Displaying of the reference value in % F = Displaying of the feedback value in % of sensor range.
DRV-01	Acceleration time	Acc. Time	10.0sec
DRV-02	Deceleration time	Dec. Time	10.0sec
DRV-03	Start / Stop control mode	Drive mode	Keypad: Start / Stop by keypad. Fx/Rx-1: Start / Stop by terminals. Int. 485: Start / Stop through communication bus.
DRV-04	Frequency control mode	Freq mode	Keypad – 1, Keypad – 2: Frequency setting by keypad.
DRV-05	Pressure reference 1	Refer Perc-1	60.00% (Reference 1 – 30.00Hz)
DRV-06	Pressure reference 2	Refer Perc-2	70.00% (Reference 2 – 35.00Hz)
DRV-07	Pressure reference 3	Refer Perc-3	80.00% (Reference 3 – 40.00Hz)
FU1-23	Stop mode	Stop mode	Decel: Deceleration controlled by parameter DRV-02. DC brake: Inverter will stop by a DC current injection. Free run: Deceleration not controlled. Stop by inertia. Fluxe brake: Fast stop using the energy regenerated to heat into the motor. (CAUTION WITH THIS OPTION).
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base Freq	50Hz – At this frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,2Hz – Minimum speed at the starting.
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 are available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-81	Delay time at the starting	Run Delay T	Delay time at the starting (optional).
FU1-85	Underload trip selection	ULT select	Yes
FU1-86	Underload level	ULT level	70% (Motor current at the frequency set in FU1-87).
FU1-87	Underload frequency	ULT freq	40.00Hz (Frequency for activating underload protection).
FU1-88	Underload trip time	ULT time	60.0sec
FU2-20	Restart after power supply fault	Power-on run	No: Inverter will not restart after losing power supply and recovering it again. Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-48	Carrier frequency	Carrier freq	2.0 kHz

Parameter	Description	Display	Value
I/O-01	Filter of analogue voltage input	V1 Filter	250ms (Filter of the analogue voltage input)
I/O-02	Minimum voltage of V1 input	V1 volt x1	0.00V (Minimum voltage of V1 input)
I/O-03	Frequency for minimum voltage of V1	V1 Freq y1	0Hz (Frequency for the minimum voltage of V1 input)
I/O-04	Maximum voltage of V1 input	V1 volt x2	10.0V (Maximum voltage of V1 input)
I/O-05	Frequency for maximum voltage of V1	V1 Freq y2	50Hz (Frequency for the maximum voltage of V1 input)
I/O-06	Filter of analogue current input I	I Filter	250ms (Filter of the analogue current input)
I/O-07	Minimum current of I input	I curr x1	4.00mA (Minimum current of I input)
I/O-08	Frequency for minimum current of I	I Freq y1	0Hz (Frequency for the minimum current of I input)
I/O-09	Maximum current of I input	I curr x2	20.00mA (Maximum current of I input)
I/O-10	Frequency for maximum current of I	I Freq y2	50Hz (Frequency for the maximum current of I input)
I/O-20	Configuration of M1 terminal	M1 define	Speed-L (Multi-speed 1)
I/O-21	Configuration of M2 terminal	M2 define	Speed-M (Multi-speed 2)
I/O-22	Configuration of M3 terminal	M3 define	Speed-H (Multi-speed 3)
I/O-23	Configuration of M4 terminal	M4 define	Open-loop (When it is activated, it allows operating at manual speed)
I/O-25	Configuration of M6 terminal	M6 define	JOG frequency (Speed preset by parameter)
I/O-30	Setting of jog frequency	Jog Freq	80.00% (Speed preset by parameter – 40.00Hz)
I/O-31	Step frequency 4	Refer Perc-4	90.00% (Multi-speed 4 – 45.00Hz)
I/O-32	Step frequency 5	Refer Perc-5	100.00% (Multi-speed 5 – 50.00Hz)
I/O-33	Step frequency 6	Refer Perc-6	94.00% (Multi-speed 6 – 47.00Hz)
I/O-34	Step frequency 7	Refer Perc-7	84.00% (Multi-speed 7 – 42.00Hz)
I/O-76	Configuration for auxiliary relay 1	Aux mode1	Run (Programmable relay is activated when the inverter is running)
I/O-80	Configuration for fault relay	Relay mode	010 (Fault relay)
I/O-86	Selection of displaying units for V1 signal	V1 Unit Sel	Percentage: (if the feedback signal is V1). Only thus it will appear the parameter DRV-00R.
I/O-87	Selection of displaying units for I signal	I Unit Sel	Percentage: (If the feedback signal is I). Only thus it will appear the parameter DRV-00R.
I/O-88	Selection of displaying units for A0, B0 signal	PulseUnitSel	Percentage: (if the feedback signal is A0, B0). Only thus it will appear the parameter DRV-00R.
APP-01	Activation of PID mode	proc PI mode	Yes
APP-06	Feedback signal	PID F/B	I (4-20mA input)
APP-10	High frequency limit in PID mode	PID Limit-H	50.00Hz
APP-11	Low frequency limit in PID mode	PID Limit-L	20.00Hz
APP-15	Output inversion in PID mode	PID Out Inv.	Yes or No (depending on the application)
APP-40	Sleep delay time	Sleep Delay	20.0sec
APP-41	Sleep frequency 0	Sleep Freq0	39.00Hz (Freq. for activating sleep mode with the speed ref. 0 active)
APP-42	Sleep frequency 1	Sleep Freq1	39.00Hz (Freq. for activating sleep mode with the speed ref. 1 active)
APP-43	Sleep frequency 2	Sleep Freq2	39.00Hz (Freq. for activating sleep mode with the speed ref. 2 active)
APP-44	Sleep frequency 3	Sleep Freq3	39.00Hz (Freq. for activating sleep mode with the speed ref. 3 active)
APP-45	Sleep frequency 4	Sleep Freq4	39.00Hz (Freq. for activating sleep mode with the speed ref. 4 active)
APP-46	Sleep frequency 5	Sleep Freq5	39.00Hz (Freq. for activating sleep mode with the speed ref. 5 active)
APP-47	Sleep frequency 6	Sleep Freq6	39.00Hz (Freq. for activating sleep mode with the speed ref. 6 active)
APP-48	Sleep frequency 7	Sleep Freq7	39.00Hz (Freq. for activating sleep mode with the speed ref. 7 active)
APP-49	Wake up level	WakeUp level	5.0% (Starting pressure REF – FBK) Example: ref. 1 = 35% and FBK = 30% Starting at 30% because APP-49 = 5%

Depending on the status of the input terminals M1, M2 and M3, different programmed pressures can be selected:

Programmed pressure	Parameter	Speed-H (M3)	Speed-M (M2)	Speed-L (M1)
40.00%	DRV-00	0	0	0
60.00%	DRV-05	0	0	1
70.00%	DRV-06	0	1	0
80.00%	DRV-07	0	1	1
90.00%	I/O-31	1	0	0
100.00%	I/O-32	1	0	1
94.00%	I/O-33	1	1	0
84.00%	I/O-34	1	1	1

2.3.2. Connections Drawing

Terminals CM / JOG: Change to manual speed set in parameter I/O-25 (NO status).
Terminals CM / M1: Terminal 1 (NO status).
Terminals CM / M2: Terminal 2 (NO status).
Terminals CM / M3: Terminal 3 (NO status).
Terminals CM / M7: Start command.
Terminals A1/C1: Programmable output relay.
Terminals 3A, 3B, 3C: Programmable fault relay.
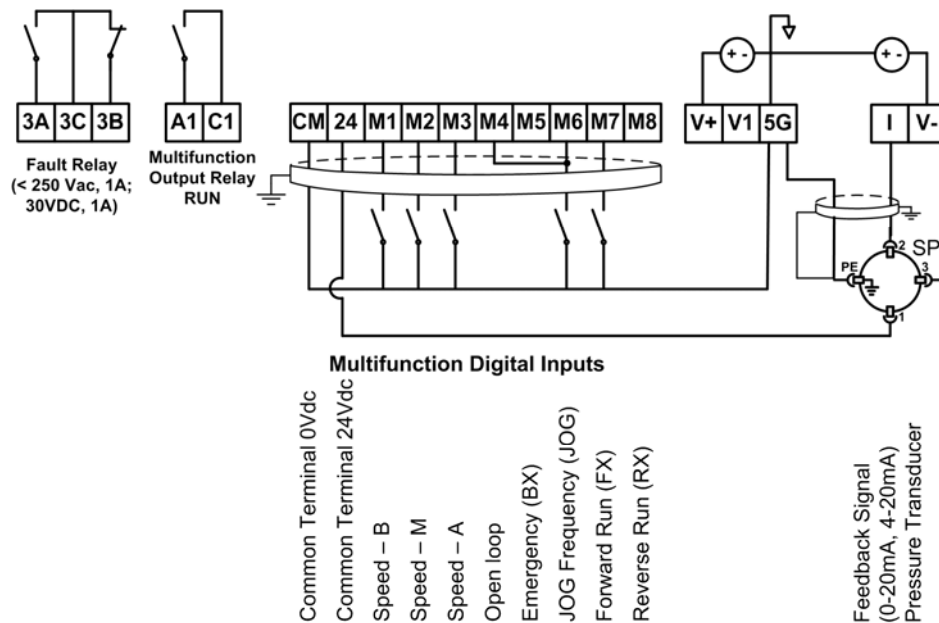
Figure 2.3. Control of one pump, eight speed references and manual speed

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW. For inverters with a capacity lower than 30kW, user should join 5G and CM terminals.

2.4. Control of 2 Pumps, Four Speed References and Speed Reference by Keypad (Under-load) as Pressure Group. Without MMC Optional Board

2.4.1. Parameters Configuration

| Parameter	Description	Display	Value
DRV-00	Pressure reference REF1	0.00	40.00% (20Hz) (Pressure reference , 20Hz x 2 =40% transducer range)
DRV-00R	Reference and feedback values of PID	R 0.0% F 0.0%	R = Displaying of the reference value in % F = Displaying of the feedback value in % of sensor range.
DRV-01	Acceleration time	Acc. Time	40.0sec
DRV-02	Deceleration time	Dec. Time	40.0sec
DRV-03	Start / Stop control mode	Drive mode	Keypad: Start / Stop by keypad. Fx/Rx-1: Start / Stop by terminals. Int. 485: Start / Stop through communication bus.
DRV-04	Frequency control mode	Freq mode	Keypad – 1, keypad – 2: Frequency setting by keypad.
DRV-05	Pressure reference 1	Refer Perc-1	60.00% (Reference 1 – 30.00Hz)
DRV-06	Pressure reference 2	Refer Perc-2	70.00% (Reference 2 – 35.00Hz)
DRV-07	Pressure reference 3	Refer Perc-3	80.00% (Reference 3 – 40.00Hz)
FU1-23	Stop mode	Stop mode	Decel: Deceleration controlled by parameter DRV-02. DC brake: Inverter will stop by a DC current injection. Free run: Deceleration not controlled. Stop by inertia. Fluxe brake: Fast stop using the energy regenerated to heat into the motor. (CAUTION WITH THIS OPTION).
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base Freq	50Hz – At this frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,5Hz – Minimum speed at the starting.
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 are available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-81	Delay time at the starting	Run Delay T	0.0sec – Delay time at the starting (optional).
FU1-85	Underload trip selection	ULT select	Yes
FU1-86	Underload level	ULT level	65% (Motor current at the frequency set in FU1-87).
FU1-87	Underload frequency	ULT freq	48.00Hz (Frequency for activating underload protection).
FU1-88	Underload time	ULT time	60.0sec
FU2-20	Restart after power supply fault	Power-on run	Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-22	Speed search function	Speed Search	0100: Speed search activated after an instant power supply fault.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-44	No load current	Noload-Curr	? A (Calculated based on 55% of In)
FU2-48	Carrier frequency	Carrier freq	3.0 KHz
FU2-67	Torque boost setting	Torque boost	Manual

Parameter	Description	Display	Value
I/O-06	Filter of analogue current input I	I Filter	250ms (Filter of the analogue current input)
I/O-07	Minimum current of I input	I curr x1	4.00mA (Minimum current of I input)
I/O-08	Frequency for minimum current of I	I Freq y1	0Hz (Frequency for the minimum current of I input)
I/O-09	Maximum current of I input	I curr x2	20.00mA (Maximum current of I input)
I/O-10	Frequency for maximum current of I	I Freq y2	50Hz (Frequency for the maximum current of I input)
I/O-20	Configuration of M1 terminal	M1 define	Speed-L (Multi-speed 1)
I/O-21	Configuration of M2 terminal	M2 define	Speed-M (Multi-speed 2)
I/O-22	Configuration of M3 terminal	M3 define	Open-loop (When it is activated, it allows operating at manual speed)
I/O-25	Configuration of M6 terminal	M6 define	Jog frequency (Speed preset by parameter)
I/O-30	Setting of jog frequency	Jog Freq	80.00% (Speed preset by parameter – 40.00Hz)
I/O-76	Configuration for auxiliary relay	Aux mode1	MMC (Multiple motors control)
I/O-80	Configuration for fault relay	Relay mode	010 (Fault relay)
I/O-86	Selection of displaying units for V1 signal	V1 Unit Sel	Percentage: (if the feedback signal is V1). Only thus it will appear the parameter DRV-00R.
I/O-87	Selection of displaying units for I signal	I Unit Sel	Percentage: (if the feedback signal is I). Only thus it will appear the parameter DRV-00R.
I/O-88	Selection of displaying units for A0, B0 signal	PulseUnitSel	Percentage: (if the feedback signal is A0, B0). Only thus it will appear the parameter DRV-00R.
APP-01	Activation of PID mode	proc PI mode	Yes
APP-02	Activation of pumps control	App. mode	MMC
APP-06	Feedback signal	PID F/B	I (4-20mA input)
APP-10	High freq. limit in PID	PID Limit-H	50.00Hz
APP-11	Low freq. limit in PID	PID Limit-L	20.00Hz
APP-33	Nbr of auxiliary motors	Nbr Aux's	1 (number of auxiliary motors for starting)
APP-40	Sleep delay time	Sleep Delay	20.0sec
APP-41	Sleep frequency 0	Sleep Freq0	39.00Hz (Freq. for activating sleep mode with the speed ref. 0 active)
APP-42	Sleep frequency 1	Sleep Freq1	39.00Hz (Freq. for activating sleep mode with the speed ref. 1 active)
APP-43	Sleep frequency 2	Sleep Freq2	39.00Hz (Freq. for activating sleep mode with the speed ref. 2 active)
APP-44	Sleep frequency 3	Sleep Freq3	39.00Hz (Freq. for activating sleep mode with the speed ref. 3 active)
APP-49	Wake up level	WakeUp level	5.0% (Starting pressure REF – FBK) Example: ref. 1 = 35% and FBK= 30% Starting at 30% because APP-49 = 5%
APP-50	Start frequency of auxiliary motor 1	Start Freq 1	49.80Hz
APP-54	Stop frequency of auxiliary motor 1	Stop Freq 1	43.00 Hz
APP-58	Delay time before connecting aux. motors	Aux start DT	180.0sec
APP-59	Delay time before stopping aux. motors	Aux stop DT	17.0sec
APP-71	Pressure difference for starting aux. motors	Aux STT FB	2%
APP-72	Pressure difference for stopping aux. motors	Aux STP FB	0%

Depending on the status of the input terminals P1 and P2, different programmed pressures can be selected:

Programmed pressure	Parameter	Speed-M (M2)	Speed-L (M1)
40.00% - 20.00Hz	DRV-00	0	0
60.00% - 30.00Hz	DRV-05	0	1
70.00% - 35.00Hz	DRV-06	1	0
80.00% - 40.00Hz	DRV-07	1	1

2.4.2. Connections Drawing

Terminals CM / M4 Change to manual speed set in parameter I/O-25 (NO status).
Terminals CM / M1: Terminal 1 (NO status).
Terminals CM / M2: Terminal 2 (NO status).
Terminals CM / M7: Start command.
Terminals A1/C1: Pump 2 start.
Terminals 3A, 3B, 3C: Fault relay.
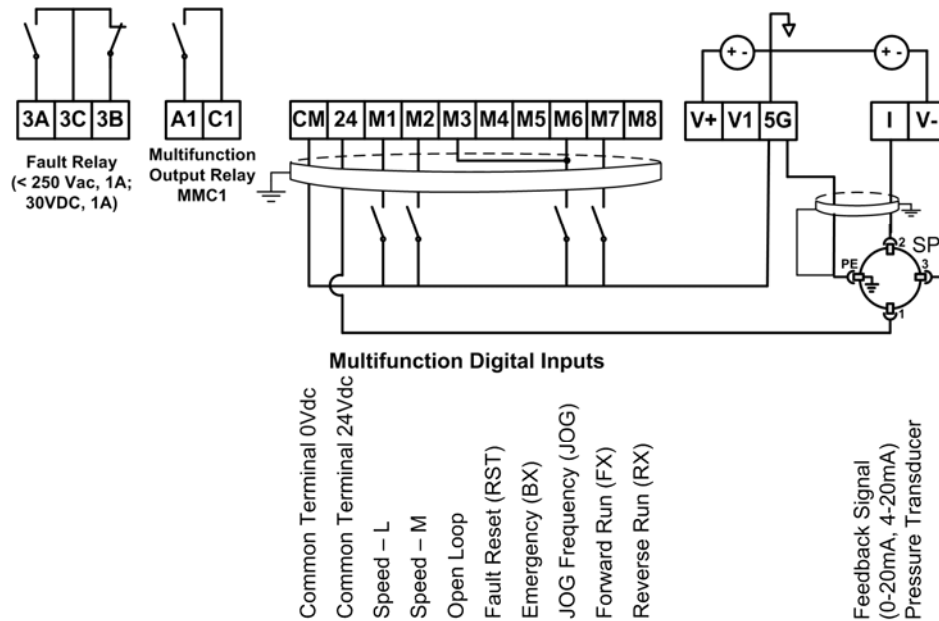
Figure 2.4. Control of two pumps, four speed references and speed reference by keypad as pressure group

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW. For inverters with a capacity lower than 30kW, user should join 5G and CM terminals.

2.5. Control of Four Pumps, Four Speed References and Speed Reference by Keypad (Under-load) as Pressure Group

2.5.1. Parameters Configuration

Parameter	Description	Display	Value
DRV-00	Pressure reference REF1	0.00	40.00% (20Hz) (Pressure reference, 20Hz x 2 =40% transducer range.)
DRV-00R	Reference and feedback value of PID	R 0.0% F 0.0%	R = Displaying of the reference value in % F = Displaying of the feedback value in % of sensor range.
DRV-01	Acceleration time	Acc. Time	10.0sec
DRV-02	Deceleration time	Dec. Time	10.0sec
DRV-03	Start / Stop control mode	Drive mode	**Keypad**: Start / Stop by terminals. **Fx/Rx-1**: Start / Stop by terminals. **Int. 485**: Start / Stop through communication bus.
DRV-04	Frequency control mode	Freq mode	**Keypad – 1**, **Keypad – 2**: Frequency setting by keypad.
DRV-05	Pressure reference 1	Refer Perc-1	60.00% (Reference 1 – 30.00Hz)
DRV-06	Pressure reference 2	Refer Perc-2	70.00% (Reference 2 – 35.00Hz)
DRV-07	Pressure reference 3	Refer Perc-3	80.00% (Reference 3 – 40.00Hz)
FU1-23	Stop mode	Stop mode	**Decel**: Deceleration controlled by parameter DRV-02. **DC brake**: Inverter will stop by a DC current injection. **Free run**: Deceleration not controlled. Stop by inertia. **Fluxe brake**: Fast stop using the energy regenerated to heat into the motor. (CAUTION WITH THIS OPTION).
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base freq	50Hz – At this frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,2Hz – Minimum speed at the starting.
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 are available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-81	Delay time at the starting	Run Delay T	0.0sec – Delay time at the starting (optional).
FU1-85	Underload trip selection	ULT select	Yes
FU1-86	Underload level	ULT level	60% (Motor current at the frequency set in FU1-87).
FU1-87	Underload frequency	ULT freq	50.00Hz (Frequency for activating underload protection).
FU1-88	Underload time	ULT time	60.0sec
FU2-20	Restart after power supply fault	Power-on run	No: Inverter will not restart after losing power supply and recovering it again. Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-48	Carrier frequency	Carrier freq	3.0 KHz
FU2-67	Torque boost setting	Torque boost	Manual

Parameter	Description	Display	Value
I/O-06	Filter of analogue current input I	I Filter	250ms (Filter of the analogue current input)
I/O-07	Minimum current of I input	I curr x1	4.00mA (Minimum current of I input)
I/O-08	Frequency for minimum current of I	I Freq y1	0Hz (Frequency for the minimum current of I input)
I/O-09	Maximum current of I input	I curr x2	20.00mA (Maximum current of I input)
I/O-10	Frequency for maximum current of I	I Freq y2	50Hz (Frequency for the maximum current of I input)
I/O-20	Configuration of M1 terminal	M1 define	Speed-L (Multi-speed 1)
I/O-21	Configuration of M2 terminal	M2 define	Speed-M (Multi-speed 2)
I/O-22	Configuration of M3 terminal	M3 define	Open-loop (When it is activated, it allows operating at manual speed)
I/O-25	Configuration of M6 terminal	M6 define	Jog frequency (Speed preset by parameter)
I/O-30	Jog frequency	Jog Freq	80.00% (Speed preset by parameter – 40.00Hz)
I/O-76	Config. for aux. relay 1	Aux mode1	Run (Programmable relay is activated when the inverter is running)
I/O-80	Config. for fault relay	Relay mode	010 (Fault relay)
I/O-86	Selection of displaying units for V1 signal	V1 Unit Sel	Percentage: (if the feedback signal is V1). Only thus it will appear the parameter DRV-00R.
I/O-87	Selection of displaying units for I signal	I Unit Sel	Percentage: (if the feedback signal is I). Only thus it will appear the parameter DRV-00R.
I/O-88	Selection of displaying units for A0, B0 signal	PulseUnitSel	Percentage: (if the feedback signal is A0, B0). Only thus it will appear the parameter DRV-00R.
APP-01	Activation of PID mode	proc PI mode	Yes
APP-02	Activ. of pumps control	App. mode	MMC
APP-06	Feedback signal	PID F/B	I (4-20mA input)
APP-10	High freq. limit in PID	PID Limit-H	50.00Hz
APP-11	Low freq. limit in PID	PID Limit-L	20.00Hz
APP-15	Output inversion in PID	PID Out Inv.	Yes or No (depending on the application).
APP-31	Connection order of auxiliary pumps	Starting Aux	1 (The connection will start for the auxiliary motor 1).
APP-33	Nbr of auxiliary motors	Nbr Aux's	4 (number of auxiliary motors for starting)
APP-40	Sleep delay time	Sleep Delay	6.0sec
APP-41	Sleep frequency 0	Sleep freq0	39.00Hz (Freq. for activating sleep mode with the speed ref. 0 active)
APP-42	Sleep frequency 1	Sleep freq1	39.00Hz (Freq. for activating sleep mode with the speed ref. 1 active)
APP-43	Sleep frequency 2	Sleep freq2	39.00Hz (Freq. for activating sleep mode with the speed ref. 2 active)
APP-44	Sleep frequency 3	Sleep freq3	39.00Hz (Freq. for activating sleep mode with the speed ref. 3 active)
APP-49	Wake up level	WakeUp level	5.0% (Starting pressure REF–FBK). Example: ref.1= 35% and FBK= 30% Starting at 30% because APP-49 = 5%
APP-50	Start frequency of auxiliary motor 1	Start Freq 1	49.00Hz
APP-51	Start frequency of auxiliary motor 2	Start Freq 2	49.00Hz
APP-52	Start frequency of auxiliary motor 3	Start Freq 3	49.00Hz
APP-53	Start frequency of auxiliary motor 4	Start Freq 4	49.00Hz
APP-54	Stop frequency of auxiliary motor 1	Stop Freq 1	15.00 Hz
APP-55	Stop frequency of auxiliary motor 2	Stop Freq 2	15.00 Hz
APP-56	Stop frequency of auxiliary motor 3	Stop Freq 3	15.00 Hz
APP-57	Stop frequency of auxiliary motor 4	Stop Freq 4	15.00 Hz
APP-58	Delay time before connecting aux. motors	Aux start DT	20.0sec
APP-59	Delay time before stopping aux. motors	Aux stop DT	5.0sec
APP-71	Pressure difference for starting aux. motors	Aux STT FB	2%
APP-72	Pressure difference for stopping aux. motors	Aux STP FB	0%

Depending on the status of the input terminals M1 and M2, different programmed pressures can be selected:

Programmed pressure	Parameter	Speed-M (M2)	Speed-L (M1)
80.00% - 40.00Hz	DRV-00	0	0
60.00% - 30.00Hz	DRV-05	0	1
70.00% - 35.00Hz	DRV-06	1	0
80.00% - 40.00Hz	DRV-07	1	1

2.5.2. Connections Drawing

Terminals CM / JOG: Change to manual speed set in parameter I/O-25 (NO status).
Terminals CM / M1: Terminal 1 (NO status).
Terminals CM / M2: Terminal 2 (NO status).
Terminals CM / M7: Start command.
Terminals A1 / C1: Start command of pump 1.
Terminals A2 / C2: Start command of pump 2.
Terminals A3 / C3: Start command of pump 3.
Terminals A4 / C4: Start command of pump 4.
Terminals 3A, 3C, 3B: Fault relay.
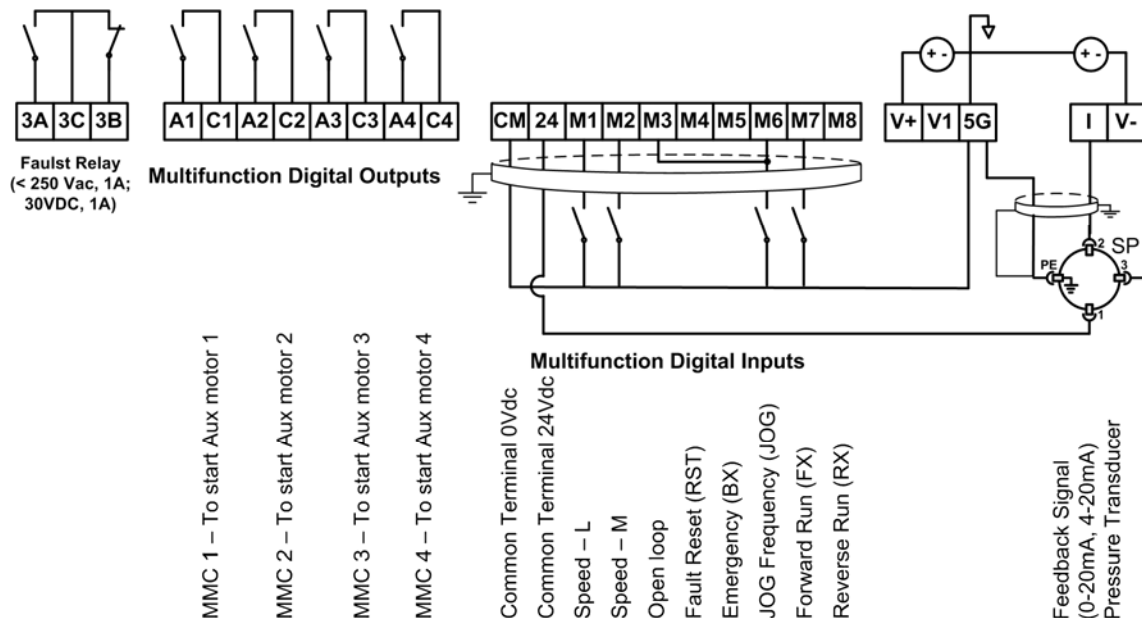
SD45DTC0018BI

Figure 2.5. Control of four pumps, four speed references and speed reference by keypad as pressure group

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW. For inverters with a capacity lower than 30kW, user should join 5G and CM terminals.

2.6. Control of Speed by Pushbuttons

2.6.1. Parameters Configuration

Parameter	Description	Display	Value
DRV-00	Reference frequency	0.00	50.00Hz
DRV-01	Acceleration time	Acc. Time	30.0sec (It determines the acceleration ramp of the potentiometer).
DRV-02	Deceleration time	Dec. Time	30.0sec (It determines the deceleration ramp of the potentiometer).
DRV-03	Start / Stop control mode	Drive mode	**Fx/Rx**-1: Start / Stop by terminals.
DRV-04	Frequency control mode	Freq mode	**Keypad** – 1: Frequency setting by keypad.
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base Freq	50Hz – At this frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,1Hz – Minimum speed at the starting.
FU1-33	Frequency limits selection	Freq limit	Yes: Limits are set in parameters FU1-34 and FU1-35.
FU1-34	Low frequency limit	F-limit Lo	25.00Hz
FU1-35	High frequency limit	F-limit Hi	50.00Hz
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-80	Save reference up / down	Up/Dn Save	Yes: The reference frequency, introduced by motorized potentiometer, will be memorized by the inverter.
FU1-81	Delay time at the starting	Run Delay T	5.0sec – Delay time at the starting.
FU2-20	Restart after power supply fault	Power-on run	No: inverter will not restart after losing power supply and recovering it again. Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-48	Carrier frequency	Carrier freq	2.0 KHz
FU2-67	Torque boost setting	Torque boost	Manual
I/O-20	Configuration of M1 terminal	M1 define	3-Wire (Start / Stop by NC pushbutton)
I/O-21	Configuration of M2 terminal	M2 define	Up (Up speed NO pushbutton)
I/O-22	Configuration of M3 terminal	M3 define	Down (Down speed NO pushbutton)

2.6.2. Connections Drawing

Terminals CM / M7: Start pushbutton (NO status).
Terminals CM / M1: Stop pushbutton (NC status).
Terminals CM / M2: Up speed pushbutton (NO status).
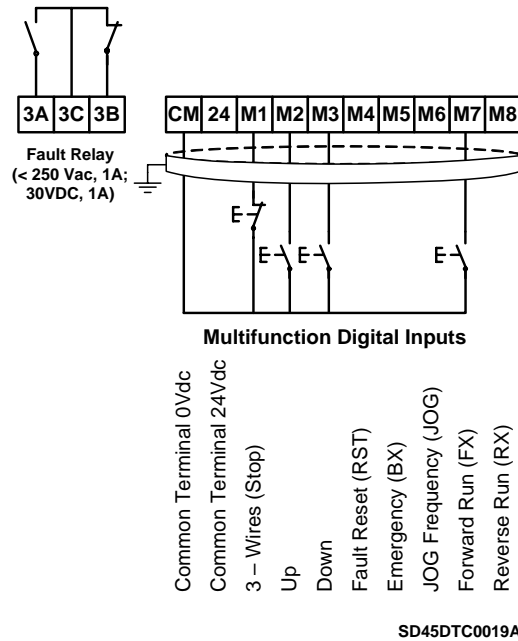Terminals CM / M3: Down speed pushbutton (NO status).

Figure 2.6. Control of speed by pushbuttons

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW.

Start command will be executed through a NO pushbutton between CM and M7 terminals. Stop command will be executed through a NC pushbutton between CM and M1 terminals. When the start command M7 is executed (CM common) the inverter will start holding the speed at 0.00Hz. When we press M2 pushbutton the speed will be increased up to minimum speed FU1-34, and if we follow pressing M2, the speed will follow being increased according to the acceleration ramp DRV-01. When we stop, the reference speed will be held if we activate the parameter FU1-80 (reference memorization).

2.7. Control of Four Pumps in Alternation mode and Four Speed References

2.7.1. Parameters Configuration

Parameter	Description	Display	Value
DRV-00	Pressure reference REF1	0.00	37.00% (18.50Hz) (Pressure reference, 18.50Hz x 2 =37.00% transducer range)
DRV-00R	Reference and feedback values of PID	R 37.0% F 0.0%	R = Displaying of the reference value in % F = Displaying of the feedback value in % of sensor range.
DRV-01	Acceleration time	Acc. Time	40.0sec
DRV-02	Deceleration time	Dec. Time	40.0sec
DRV-03	Start / Stop control mode	Drive mode	Fx/Rx-1: Start / Stop by terminals.
DRV-04	Frequency control mode	Freq mode	Keypad – 1: Frequency setting by keypad.
DRV-05	Pressure reference 1	Refer Porc-1	30.00% (Reference 1 – 15.00Hz)
DRV-06	Pressure reference 2	Refer Porc-2	40.00% (Reference 2 – 20.00Hz)
DRV-07	Pressure reference 3	Refer Porc-3	50.00% (Reference 3 – 25.00Hz)
FU1-29	Line frequency	Line Freq	50.00Hz – Frequency of the commercial line voltage.
FU1-30	Maximum frequency	Max Freq	50Hz – Maximum speed of the equipment.
FU1-31	Base frequency	Base Freq	50Hz – At this frequency, the inverter supplies the rated output voltage. Set this frequency according to the motor nameplate.
FU1-32	Start frequency	Start Freq	0,2Hz – Minimum speed at the starting.
FU1-49	Input voltage setting	VAC 400.4V – 91.0%	Setting of the commercial line voltage.
FU1-50	Motor rated voltage	Motor Volt	400V – Setting of the motor rated voltage.
FU1-60	Electronic thermal protection	ETH select	Yes: In this case, FU1-61 and FU1-62 are available.
FU1-61	Electronic thermal protection level for 1 minute	ETH 1min	150%
FU1-62	Electronic thermal protection level for continuous	ETH cont	105%
FU1-81	Delay time at the starting	Run Delay T	0.0sec – Delay time at the starting (optional).
FU2-20	Restart after power supply fault	Power-on run	No: Inverter will not restart after losing power supply and recovering it again. Yes: Inverter will restart after losing power supply and recovering it again.
FU2-21	Restart after fault reset	RST restart	No: Inverter will not restart after occuring a fault and resetting it. Yes: Inverter will restart after occuring a fault and resetting it.
FU2-40	Motor power setting	Motor select	3,7kW 5,5kW 7,5kW 11kW 15kW 18,5kW 22kW 30kW 37kW 45kW 55kW 75kW
FU2-41	Number of motor poles	Pole number	2 poles ≡ 3000 rpm 4 poles ≡ 1500 rpm 6 poles ≡ 750 rpm
FU2-43	Motor rated current	Rated-Curr	?A (Set the current according to the motor nameplate).
FU2-48	Carrier frequency	Carrier freq	3.0 KHz
FU2-67	Torque boost setting	Torque boost	Manual
I/O-06	Filter of analogue current input I	I Filter	250ms (Filter of the analogue current input)
I/O-07	Minimum current of I input	I curr x1	4.00mA (Minimum current of I input)
I/O-08	Frequency for minimum current of I	I Freq y1	0Hz (Frequency for the minimum current of I input)
I/O-09	Maximum current of I input	I curr x2	20.00mA (Maximum current of I input)
I/O-10	Frequency for maximum current of I	I Freq y2	50Hz (Frequency for the maximum current of I input)
I/O-20	Configuration of M1 terminal	M1 define	Interlock1 (Closed contact for out of service of auxiliary motor 1)
I/O-21	Configuration of M2 terminal	M2 define	Interlock2 (Closed contact for out of service of auxiliary motor 2)
I/O-22	Configuration of M3 terminal	M3 define	Interlock3 (Closed contact for out of service of auxiliary motor 3)

| Parameter	Description	Display	Value
I/O-23	Configuration of M4 terminal	M4 define	Interlock4 (Closed contact for out of service of auxiliary motor 4)
I/O-24	Configuration of M5 terminal	M5 define	Speed-L (Multi-speed 1)
I/O-25	Configuration of M6 terminal	M6 define	Speed-M (Multi-speed 2)
I/O-76	Configuration for auxiliary relay 1	Aux mode1	MMC (Programmable relay for activating auxiliary motor 1)
I/O-77	Configuration for auxiliary relay 2	Aux mode2	MMC (Programmable relay for activating auxiliary motor 2)
I/O-78	Configuration for auxiliary relay 3	Aux mode3	MMC (Programmable relay for activating auxiliary motor 3)
I/O-79	Configuration for auxiliary relay 4	Aux mode4	MMC (Programmable relay for activating auxiliary motor 4)
I/O-80	Config. for fault relay	Relay mode	010 (Fault relay)
I/O-86	Selection of displaying units for V1 signal	V1 Unit Sel	Percentage: (If the feedback signal is V1). Only thus it will appear the parameter DRV-00R.
I/O-87	Selection of displaying units for I signal	I Unit Sel	Percentage: (If the feedback signal is I). Only thus it will appear the parameter DRV-00R.
I/O-88	Selection of displaying units for A0, B0 signal	PulseUnitSel	Percentage: (if the feedback signal is A0, B0). Only thus it will appear the parameter DRV-00R.
APP-01	Activation of PID mode	proc PI mode	Yes
APP-02	Activ. of pumps control	App. Mode	MMC
APP-06	Feedback signal	PID F/B	I (4-20mA input)
APP-07	Proportional gain in PID mode	PID P-Gain	100.0%
APP-08	Integral gain in PID mode	PID I-Time	0.5sec
APP-10	High freq. limit in PID	PID Limit-H	50.00Hz
APP-11	Low freq. limit in PID	PID Limit-L	20.00Hz
APP-15	Output inversion in PID	PID Out Inv.	No
APP-31	Connection order of auxiliary pumps	Starting aux	1 (The connection will start for the auxiliary motor 1).
APP-33	Nbr of auxiliary motors	Nbr Aux's	3 (number of auxiliary motors for starting)
APP-40	Sleep delay time	Sleep Delay	6.0sec
APP-41	Sleep frequency 0	Sleep Freq0	39.00Hz (Freq. for activating sleep mode with the speed ref. 0 active)
APP-42	Sleep frequency 1	Sleep Freq1	39.00Hz (Freq. for activating sleep mode with the speed ref. 1 active)
APP-43	Sleep frequency 2	Sleep Freq2	39.00Hz (Freq. for activating sleep mode with the speed ref. 2 active)
APP-44	Sleep frequency 3	Sleep Freq3	39.00Hz (Freq. for activating sleep mode with the speed ref. 3 active)
APP-49	Wake up level	WakeUp level	5.0% (Starting pressure REF–FBK). Example: ref.1= 35% and FBK= 30% Starting at 30% because APP-49 = 5%
APP-50	Start frequency of auxiliary motor 1	Start Freq 1	49.00Hz
APP-51	Start frequency of auxiliary motor 2	Start Freq 2	49.00Hz
APP-52	Start frequency of auxiliary motor 3	Start Freq 3	49.00Hz
APP-53	Start frequency of auxiliary motor 4	Start Freq 4	49.00Hz
APP-54	Stop frequency of auxiliary motor 1	Stop Freq 1	35.00 Hz
APP-55	Stop frequency of auxiliary motor 2	Stop Freq 2	35.00 Hz
APP-56	Stop frequency for auxiliary motor 3	Stop Freq 3	35.00 Hz
APP-57	Stop frequency for auxiliary motor 4	Stop Freq 4	35.00 Hz
APP-58	Delay time before connecting aux. motors	Aux start DT	180.0sec
APP-59	Delay time before stopping aux. motors	Aux stop DT	17.0sec
APP-60	Accel. time for the ramp of auxiliary motors	AUX AccTime	2.0 sec
APP-61	Dec. time for the ramp of auxiliary motors	AUX DecTime	2.0 sec
APP-66	Rotation mode (auto change) of aux. motors	AutoCh_Mode	2: Inverter rotates for all of the motors.
APP-67	Time for auto change	AutoEx-intv	00:01: Inverter will rotate if more than 1 minute has elapsed operating with the same motor.

Parameter	Description	Display	Value
APP-69	Detection of motors out of service	Inter-lock	Yes: Inverter will detect the motors that are out of service, and it will not consider them at the moment of connecting them until they are repaired.
APP-71	Pressure difference for starting aux. motors	Aux STT FB	2%
APP-72	Pressure difference for stopping aux. motors	Aux STP FB	0%

Depending on the status of the input terminals M5 and M6, different programmed pressures can be selected:

Programmed pressure	Parameter	Speed-M (M5)	Speed-L (M6)
37.00% - 18.50Hz	DRV-00	0	0
30.00% - 15.00Hz	DRV-07	0	1
40.00% - 20.00Hz	DRV-08	1	0
50.00% - 25.00Hz	DRV-09	1	1

2.7.2. Connections Drawing

Terminals CM / M7: Start command (NO status).
Terminals CM / M1: Thermal switch of Pump 1 (NC status).
Terminals CM / M2: Thermal switch of Pump 2 (NC status).
Terminals CM / M3: Thermal switch of Pump 3 (NC status).
Terminals CM / M4: Thermal switch of Pump 4 (NC status).
Terminals CM / M5: Selection of pressure reference (NO status).
Terminals CM / M6: Selection of pressure reference (NO status).
Terminals A1 / C1 (Aux Relay 1): Command of Contactor of Pump 1.
Terminals A2 / C2 (Aux Relay 2): Command of Contactor of Pump 2.
Terminals A3 / C3 (Aux Relay 3): Command of Contactor of Pump 3.
Terminals A4 / C4 (Aux Relay 4): Command of Contactor of Pump 4.
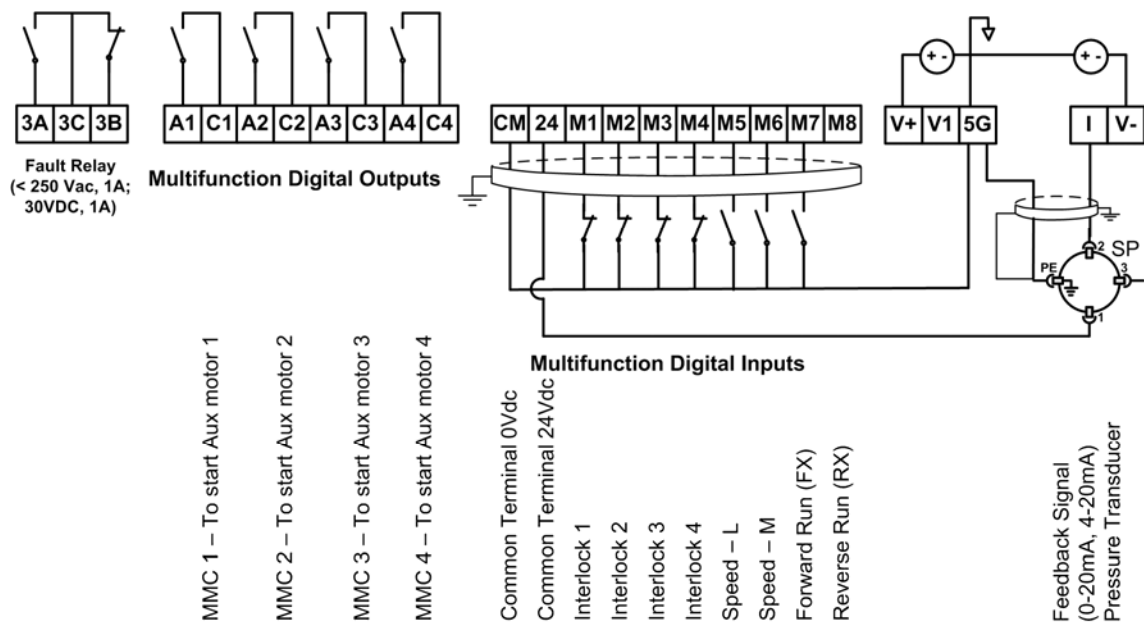
Figure 2.7. Control of four pumps in alternation mode and four speed references

Note: Control cables have to be screened and must be connected to the ground.
5G terminal will be CM terminal for inverters with a capacity equal or higher than 30kW. For inverters with a capacity lower than 30kW, user should join 5G and CM terminals.

POWER ELECTRONICS

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