TECORP INVERTERS

APPLICATION EXAMPLES IN AUTOMATION INDUSTRY

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TECORP frequency inverter in application of automation industry:
1) Beer refrigerating compressor
2) Linear rod pump
3) Carving machine
4) Screen printing machine
5) CNC machine
6) Conveyor
7) Stretching machine
8) PID control

Chapter 1: HC2-A1000 for beer refrigerating compressor

A. Example:

1. Motor: 200KW
2. Inverter: 220KW

When the temperature Sensor feedbacks signal (0~10V) to the inverter, the inverter will adjust sucking pressure of the compressor to stable temperature by the PID function. In the meanwhile, the inverter will prevent the machine from damage.

The wiring as below:
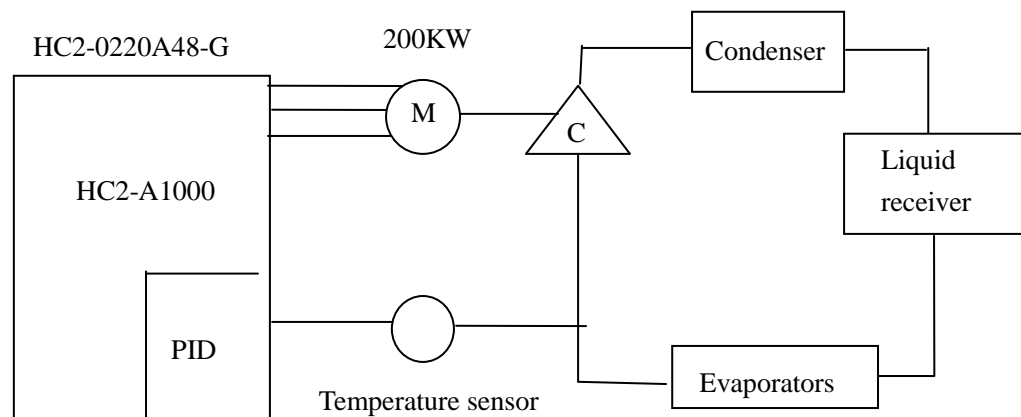
B. Performance:

1. Energy saving: Running in perfect points will decrease power wasting.
2. Constant temperature: Continuous volume control   and the compressor will make difference less in temperature for freezers

C. Notice:

1. Please lubricate the air cylinder and other relevant parts
2. The minimum frequency should be 25Hz for 3.7KW~7.35KW of the inverter because of lubrication
3. The maximum frequency should be rated frequency of the motor.
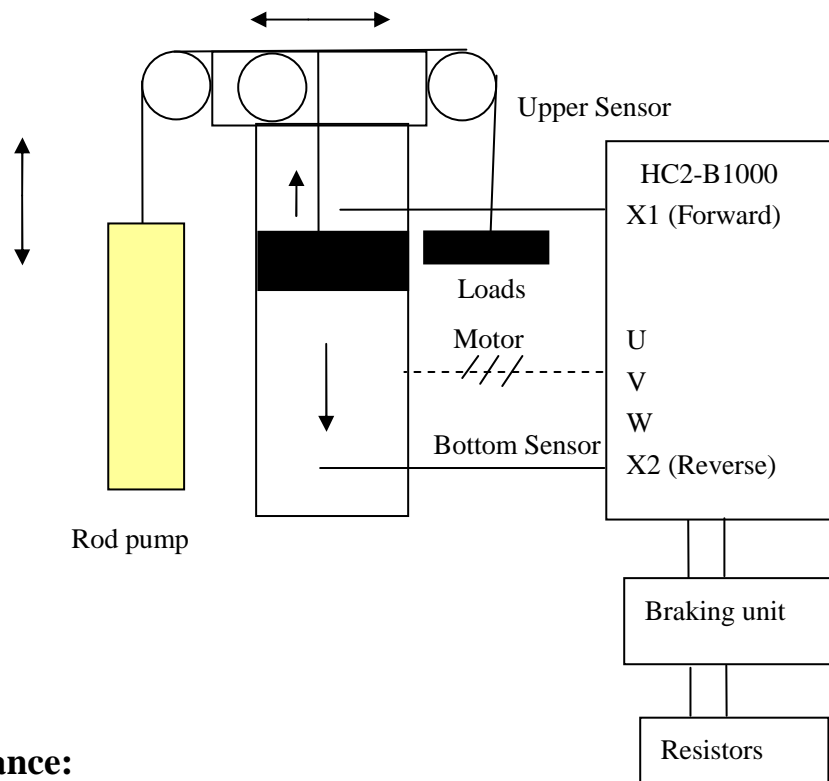
Chapter 2: HC2-B1000 for linear rod pump

A. Example:

3. Linear rod pump:
    1: 0~10Hz of frequency range (continuous adjustment)
    2: 0~300 V of start voltage at 0Hz (continuous adjustment)
    3: Regular ordering of motor rotator as below:
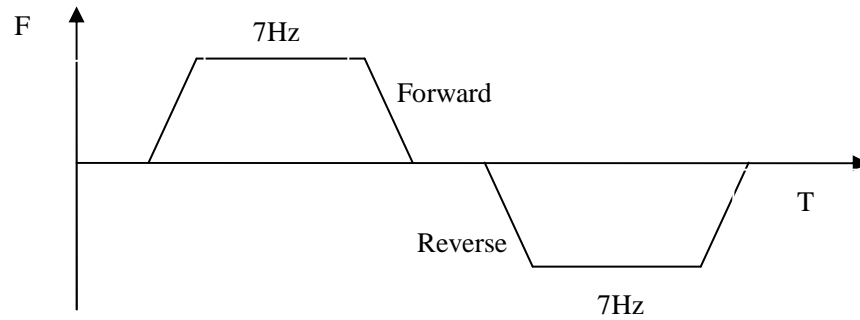
B. Wiring

The upper sensor receives forward signal. The lower sensor receives reverse signal. The wiring as below:
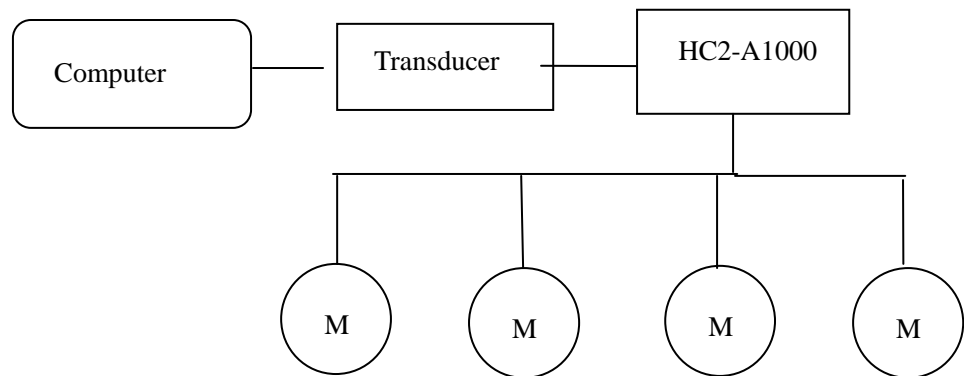

C. Performance:

1. Stable start, stop in low frequency.
2. Time resolution is 0.1s. Frequency resolution is 0.01Hz.
3. 15% energy saving.
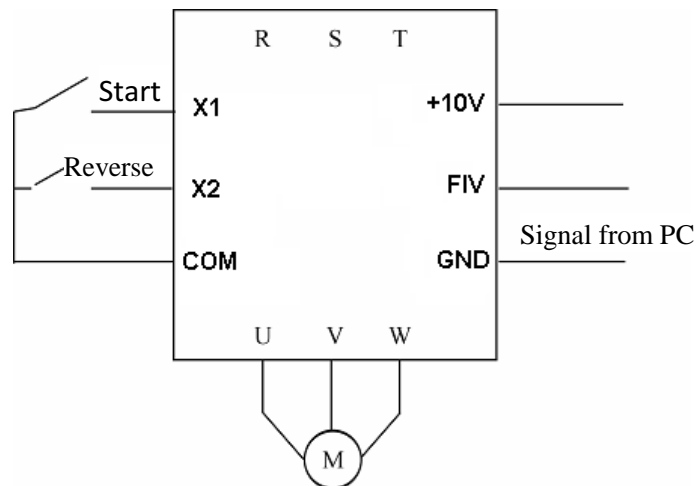
Chapter 3: HC2-A1000 for carving machine

A. Example:

1. Control mode: V/F
2. Two-wire control: X1 for forward, X2 for reverse
3. Analog setting frequency: 0~10VDC
4. Running speed: 0~21000r/min (0~350 Hz of running frequency for 2P motor)
5. The inverter will control 4 motors, which means it can carve 4 pieces at the same time.

B. Connection:

C. Wiring:

D. Performance:

1. Cut in lower speed and stable torque in lower frequency
2. Shorter time in acceleration and deceleration

Chapter 4: HC2-B1000 for screen printing machine

A. Example:

◎ Motor: one unit of 0.55KW / 220V and one unit of 0.75KW / 220V.
◎ Inverter: two units of 0.75KW /220V. They will individually run transmission of the printing and lift of the inclined arm.

B. Wiring:

1. Right-left traverse
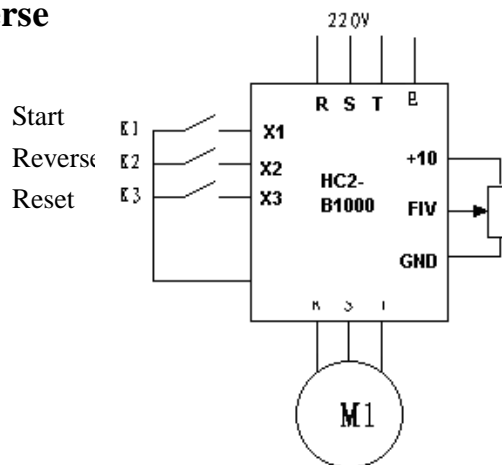
§ Parameters:

Parameter	Value	Parameter	Value
F2-01~F2-05	Parameters for motor	F0-12	Auto-tuning
F0-08	0.1s	F0-00	0
F0-10	2	F0-09	0.1s
F5-02	7	F5-01	2

2. Up-down traverse
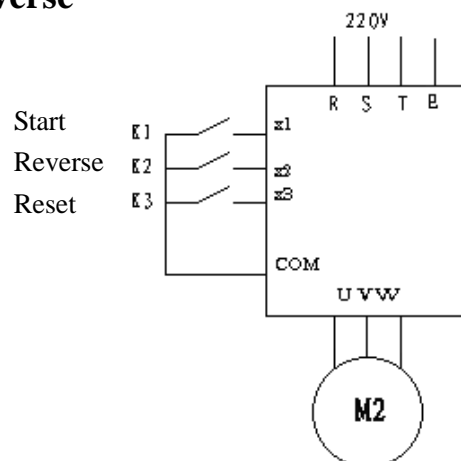
§ Parameter:

Parameter	Value	Parameter	Value
F2-01~F2-05	Parameters for motor	F0-12	Auto-tuning
F0-00	0	F0-08	0.05s
F0-09	0.05s	F0-10	2
F5-01	2	F5-02	7

C. Performance:

1. Enhance 20% of the speed for traverse
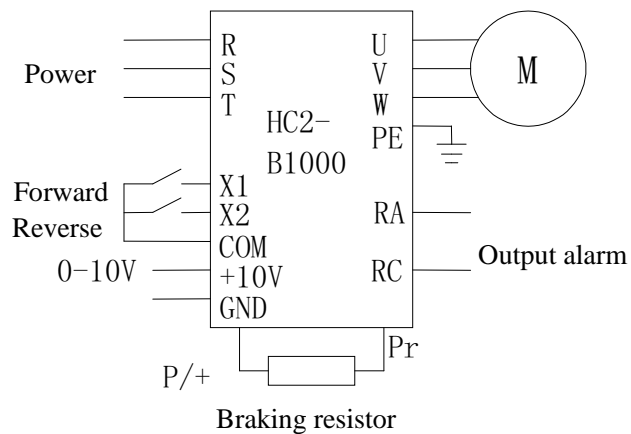2. Closer to the requested position by 1 cm

Chapter 5: HC2-B1000 for CNC machine

A. Example:

1. Motor: 3KW / 4P
2. Transmission: belt
3. Adjustment ratio: 1:1
4. Frequency signal: 0~10V

B. Wiring:

C. Parameter:

Parameter	Value	Content
F2-01	3	Rated capacity of motor
F2-04	380	Rated voltage of motor
F2-05	7.8	Rated current of motor
F2-03	1450	Rated speed of motor
F0-12	2	Auto-tuning
F3-06	120	Compensation slip
F1-05	1	Stop mode
F0-04	120	Maximum output frequency
F0-05	120	Upper limited frequency
F0-08	1	Acceleration time
F0-09	1	Deceleration time
F5-01	2	Reverse

D. Performance

1. Speed deflection:

Axis speed (r/min)	Speed deflection (r/min)
50	±2
100	±1.5
300	±2
500	±2
800	±2
1200	±3
1500	±4
2000	±5
3000	±7

2. Feed volume of single edge:

Axis speed (r/min)	Speed deflection（%）	Feed volume of Single edge（mm）
50	±2.5	1
100	±2	1·5
200	±2	2
300	±1.5	2.5
500	±3	4

Chapter 6: HC2-B1000 for conveyor

A. Example:

1. Motor: 2 units of 2.2KW / 380V / 50Hz / 1430rpm
2. Running speed: 700 rpm (maximum error: 2rpm)
3. Speed down/up: 5 seconds

B. Wiring:
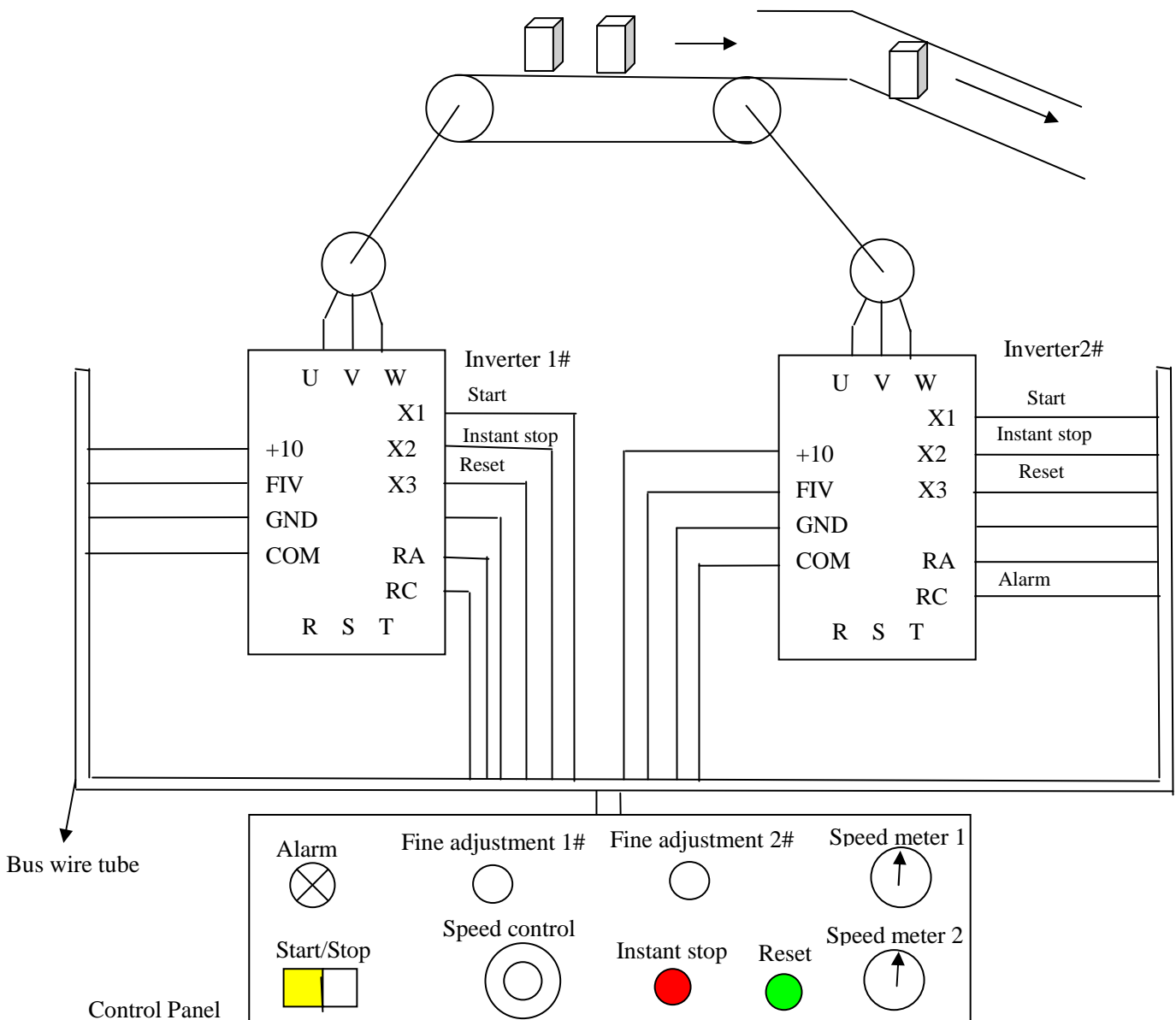
C. Control panel:

Panel	Description
Fine adjustment 1#	Terminal 1# FIC inputting from 4 to 20mA Frequency range: 0~5Hz
Fine adjustment 2#	Terminal 2# FIC inputting from 4 to 20mA Frequency range: 0~5Hz
Speed meter 1	Terminal 1# A0 outputting feedback value Monitor speed of the motor
Speed meter 2	Terminal 2# A0 outputting feedback value Monitor speed of the motor
Speed control	Setting frequency for 1# & 2# by FIV (0~10V)
Start/Stop	Start/Stop for 1# & 2 by terminal X1
Instant stop	Instant stop by terminal X2 (it is effective that this terminal connects terminal 20)
Reset	Reset after an alarm by terminal X3

D. Process:

1. Clear value to zero in the fine adjustment 1# & 2#
2. Adjust setting frequency to what you request in the speed control
3. Push the Start/Stop button, then inverter 1# &2# will run
4. Observe if the speed meter 1 &2 have error. If yes, please adjust the fine adjustment 1# & 2#

E. Parameter:

| Parameter	Value	Parameter	Value
F0-00	0	F0-08	5
F2-01	2.2	F2-02	50
F2-05	5	F2-03	1430
F0-09	5		

F. Performance:

1. When the motor speed is less than 1500rpm, the maximum error is ±1.5rpm.

2. When the motor speed is more than 1500rpm, the maximum error is 0.1% of the actual speed.

Chapter 7: HC2-B1000 for stretching machine

A. Example:

1. Motor: 70KW / 1440rpm / 380V / 152amp
2. Request: 8~10mm of diameter needs stretching into 6mm (stretching speed: 0~50m/min)

B. Wiring:
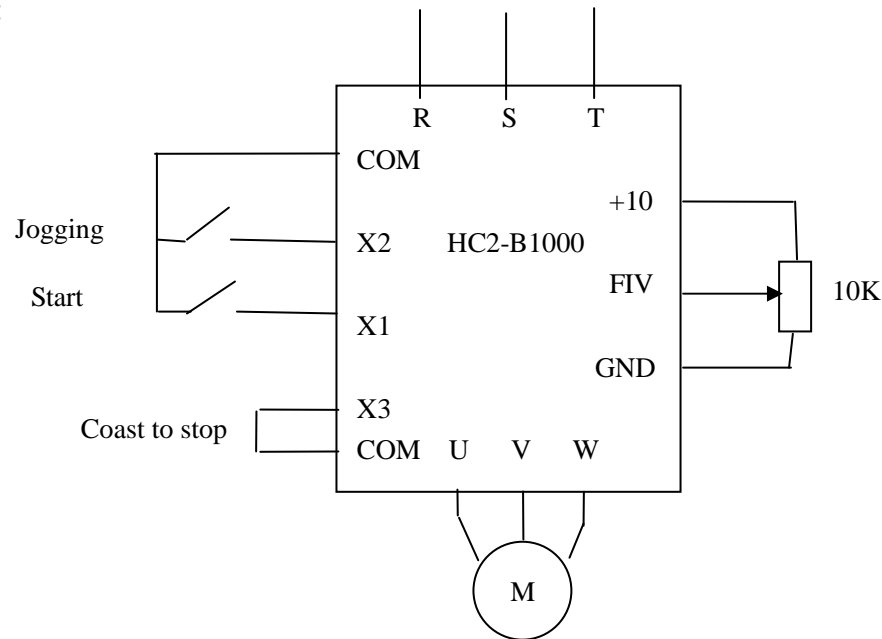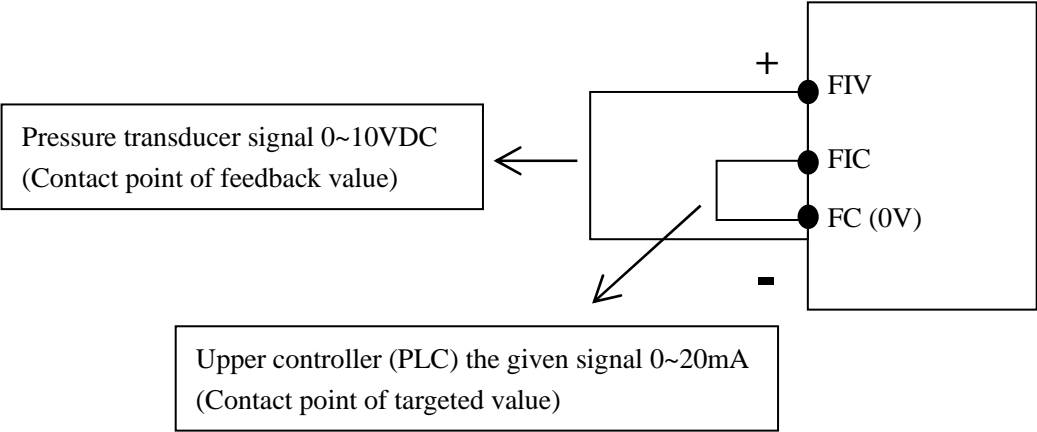

C. Performance: (After auto-tuning)

1. Output torque of the inverter is stable and less current in 5~30Hz

Chapter 8: PID control

A. Example:

1. PLC: set pressure range during 0 to 3Mpa (corresponding to 0~20mA) When the FIC sending 1.5Mpa (10mA) comparing with FIV, value of FIV will be lower than FIC. Then inverter will speed up to targeted valve of FIC in order to keep supplying water under constant pressure.

2. Parameter:
F0-03 = 1 (turn on PID function)
F0-08 = time of speed up
F0-09 = time of speed down
F9-01= 0 (Commands will be given by the operation panel)
F9-02= 0 (Analog FIV feedback)
F9-03= 1 (negative PID control)
F9-04~F9.06 = PID value (Proportional Gain (Kp), Integral time (Ti), Differential time (Td))

B. Wiring:

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Pressure transducer signal 0~10VDC          +    ● FIV
(Contact point of feedback value)    ←            ● FIC
                                                  ● FC (0V)
                                             -

                    Upper controller (PLC) the given signal 0~20mA
                    (Contact point of targeted value)
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Comparing pressure value of FIC as targeted value to FIV as feedback value, the frequency of inverter will be going up when pressure of feedback value is lower than pressure of targeted value. On the contrary the frequency of inverter will be going down.