

**DIGITEK**

**DIGITEK MOTOR CONTROLLER**

DIGITEK-IRC  
SINGLE PHASE

*Technical Handbook*

DIGITEK International

## **1. About DIGITEK**

Rapid development of industry and luxurious raise of living standard make the energy shortage a worldwide concern. Even worse, much of the energy is wasted. The energy consumed by induction motors is one of the vivid examples that a lot of energy is unnecessary wasted. As early as 1977, it was already pointed out by NASA scientists that an induction motor often consumes more energy than needed.

Since its inception, Digitek has focused its resources on developing energy saving devices for induction motors. With our strong multinational research and development team, we began to have our basic energy saving device available in the market. Though, our products had been quickly accepted in the market in a very short time, we understood the need to further develop more specialized products for better applications. Our first successful unit was that for the oil pump jack. With the help of many oil companies worldwide, we had developed a special unit for oil pump jack. This unit is now widely used in many oil fields. Currently we are working on a new oil pump jack energy saving device, DIGITEK-IIIOP, for wider range of application.

We had then further developed a unit suitable for single-phase coolers and freezers. This unit was designed by taking into account of the operational features of refrigeration compressors. This unique unit can save energy more than 20%, depending on the design of the coolers and freezers. The application of this unit is rapidly growing. It not only helps saving energy, but also provides many protections for refrigeration compressors. As a result, some of the traditional protection devices are not needed. This design has patents from the United States and many other countries. Many of the well-known companies including many distributors of Coca Cola in many regions have already installed this unit in their coolers, in order to save energy, to enhance their ecology protection image, and to strengthen their market competition power.

We have now developed a three-phase motor control device, DIGITEK-IIIGS, with features including soft start, energy saving, phase loss protection, low and high voltage protection, over current protection, remote motor start-stop control and external bypass. The patent for this design is under pending in many countries. Based on this sophisticated system, we now have further developed a most efficient energy saving control system, DIGITEK-IIIAC, for three-phase medium size air compressors with air reservoir. When the motor is running with air compressor loaded, DIGITEK-IIIAC saves energy according to the load of the motor. On the

other hand, when the motor is running with the compressor unloaded, instead of keeping the motor running as in the conventional case, DIGITEK-IIIAC stops the motor completely. The soft start allows a compressor to start and stop frequently. This design has patents from the United States and many other countries.

In addition to motor controllers described above, we have developed energy saver specifically for fluorescent and HID lighting system. For power supply at rated voltage, this device can save energy 15 % or more. With this energy saving device, DIGITEK-ILT, the luminosity is kept to that required by lighting system designed. It also prolongs the life span of the lighting devices. This design is under patent pending in many countries.

Digitek Technology is a company committed to the development of best energy saving motor control system. We emphasize on energy saving devices for specific applications in order to enhance the energy saving efficiency, the motor protection capability and the power supply stability. We have strong research and development team, efficient production facilities and rapid growing of worldwide marketing network.

## **2. FEATURES**

DIGITEK-IRC is specially designed for application on single-phase refrigeration compressors. It is not only for energy saving on the electric power consumption, it also provides many protection features for refrigeration compressors, such as high voltage protection, low voltage protection, over low voltage protection, high current protection, super high current protection, and delay start. These protection features not only provide protections to the compressor, some of the protection devices such as thermal over current protection commonly used can be eliminated.

### **a. Low Voltage Protection**

\*Rated voltage 120 VAC: When the input voltage is below 95 VAC, the unit stops energy saving with the LED flashing rapidly. When the input voltage returns to 98 VAC or above, the unit resumes energy saving.

\*Rated voltage 220 VAC: When the input voltage is below 190 VAC, the unit stops energy saving with the LED flashing rapidly. When the input voltage returns to 195 VAC or above, the unit resumes energy saving.

\*Rated voltage 240 VAC: When the input voltage is below 205 VAC, the unit

stops energy saving with the LED flushing rapidly. When the input voltage returns to 210 VAC or above, the unit resumes energy saving.

b. Over Low Voltage Protection

\*Rated voltage 120 VAC: When the input voltage is below 90VAC for 30 seconds continuously, the unit stops output and the motor is therefore stopped. When the input voltage returns to 91 VAC or above for 36 seconds continuously, the unit resumes the output and restarts the motor.

\*Rated voltage 220 VAC: When the input voltage is below 180VAC for 30 seconds continuously, the unit stops output and the motor is therefore stopped. 36 seconds after the input voltage returns to 182VAC or above, the unit resumes the output and restarts the motor.

\*Rated voltage 240 VAC: When the input voltage is below 200 VAC for 30seconds continuously, the unit stops output and the motor is therefore stopped. 36 seconds after the input voltage returns to 202VAC or above, the unit resumes the output and restarts the motor.

c. Over Voltage Protection

\*Rated voltage 120 VAC: When the input voltage is higher than 145 VAC for 30 seconds continuously, the unit stops output and the motor is therefore stopped. When the input voltage returns to 143VAC or below for 36 seconds continuously, the unit resumes the output and restarts the motor.

\*Rated voltage 220 VAC: When the input voltage is below 290 VAC for 30seconds continuously, the unit stops output and the motor is therefore stopped. When the input voltage returns to 288VAC or below for 36 seconds continuously, the unit resumes the output and restarts the motor.

\*Rated voltage 240 VAC: When the input voltage is below 300 VAC for 30 seconds continuously, the unit stops output and the motor is therefore stopped. When the input voltage returns to 298 VAC or below for 36 seconds continuously, the unit resumes the output and restarts the motor.

d. Low Current Protection

\*Rated current 10 AMPS: When current is below 0.75 A, the unit will switch to bypass mold, i.e. full voltage output. When current is equal to 1 A or

higher, the unit returns to energy saving mode.

\*Rated current 15 AMPS: When current is below 1.5 AMPS, the unit will switch to bypass mode, i.e. full voltage output. When current is equal to 2.0 AMPS or higher, the unit returns to energy saving mode.

\*When the compressor is stopped the lighting system and fan might still be working. In this case the voltage drop might be too much and the lighting might therefore not work properly. To avoid this kind of problem, one may adjust the low current protection value higher than the current when the compressor is stopped.

e. Over Current Protection:

\*Rated current 10 AMPS: When current is over 10 AMPS for 5 minutes, the unit stops the output and therefore stops the motor. The higher the over current is, the quicker the motor is stopped. 33 seconds after the motor is stopped, the unit will resume the output and restarts the motor.

\*Rated current 15 AMPS: When current is over 15 AMPS for 5 minutes, the unit stops the output and therefore stops the motor. The higher the over current is, the quicker the motor is stopped. 33 seconds after the motor is stopped, the unit will resume the output and restarts the motor.

\*For better protection, the over current protection can be adjusted according to the actual size of the compressor. The rated current of the compressor should be smaller than that of DIGITEK unit.

f. Super Over Current Protection

\*Rated current 10 AMPS: When current is over 40 AMPS for 6 seconds continuously, the unit stops the output immediately and therefore stops the motor. 33 seconds after the motor is stopped, the unit will resume the output and restarts the motor.

\*Rated current 15 AMPS: When current is over 60 AMPS for 6 seconds continuously, the unit stops the output immediately and therefore stops the motor. 33 seconds after the motor is stopped, the unit will resume the output and restarts the motor.

g. Energy Saving Modes:

i. Semiautomatic Mode:

For motor operating under foxed load, it is possible to adjust to the best saving condition (LED in red).

ii. Automatic Mode:

For motor operating under changing load, the voltage will be lower as the load is lower and vise versa (LED in green).

### 3. SPECIFICATIONS

MODEL	SRC010A120	SRC015A120	SRC010A220	SRC015A220	SRC010A240	SRC015A240	Reaction Time	Restore Time
Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz		
Rated Voltage Volt	120V	120V	220V	220V	240V	240V		
Rated Current, Amp	10A±10%	15A±10%	10A±10%	15A±10%	10A±10%	15A±10%		
Low Voltage Bypass Volt	95V±2V	95V±2V	190V±2V	190V±2V	205V±2V	205V±2V	1 Sec	1 Sec
Over Low Voltage Protection, Volt	90V±3V	90V±3V	180V±3V	180V±3V	200V±3V	200V±3V	30 Sec	36 Sec
Over Voltage Protection, Volt	145V±3V	145V±5V	290V±3V	290V±5V	300V±5V	300V±5V	30 Sec	36 Sec
Low Current Protection, Amp	0.6A	1.5A	0.6A	1.5A	0.6A	1.5A	1 Sec	1 Sec
Over Current Protection, Amp	10A±10%	15A±10%	10A±10%	15A±10%	10A±10%	15A±10%	300 Sec	33 Sec
Super Over Current Protection, Amp	40A	60A	40A	60A	40A	60A	6 Sec	33 Sec
Delay Start	3 Sec	3 Sec	3 Sec	3 Sec	3 Sec	3 Sec		
Delay Energy Saving	6 Sec	6 Sec	6 Sec	6 Sec	6 Sec	6 Sec		

#### 4. MODELS

Models No	Rated Voltage	Allowed Voltage	Max Current	Frequency
SRC010A220	220V	200VAC~240VAC	10Amps	50/60HZ
SRC015A220	220V	200VAC~240VAC	15Amps	50/60HZ
SRC025A220	220V	200VAC~240VAC	25Amps	50/60HZ
SRC040A220	220V	200VAC~240VAC	40Amps	50/60HZ

For 120V, 220V, 230V, 240V, 277V please contact DIGITEK.

#### 5. INSTALLATION

##### 5.1 Location for Installation

- It is better to install the DIGITEK-IRC as close to the motor as possible, in order to reduce the possible signal transmission lose.
- Avoid any electronic control device between the DIGITEK-IRC and the motor, in order to avoid any signal interference from the electronic control device.
- Avoid capacitors between DIGITEK-IRC and motor, because capacitors can interfere the normal function of DIGITEK-IRC.
- Install the DIGITEK-IRC at a place with good air ventilation to have better heat dissipation for the heat sink.

##### 5.2 Installation Diagrams

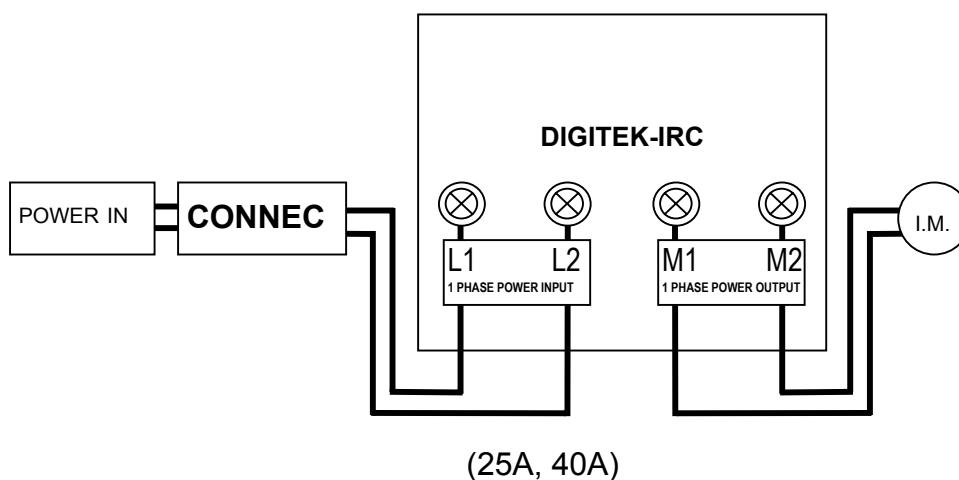
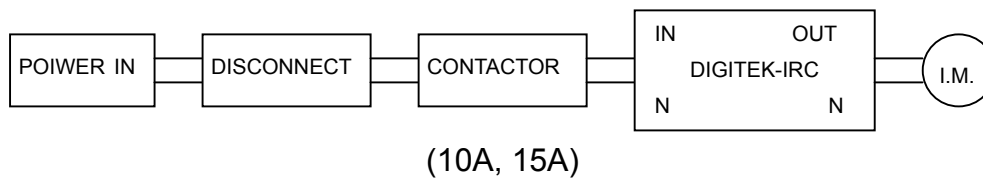


Fig. 5.2

As shown in Fig. 5.2, just install the DIGITEK-IRC between the appliances and the power supply.

### 5.3 Parameter Setting

#### DIGITEK-IRC Control Board for 10 Amps and 15 Amps

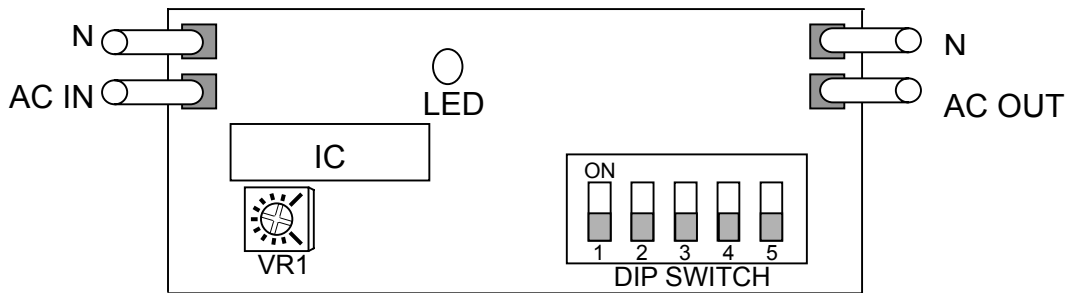


Fig. 5.3

#### DIGITEK-IRC Control Board for 25 Amps and 40 Amps

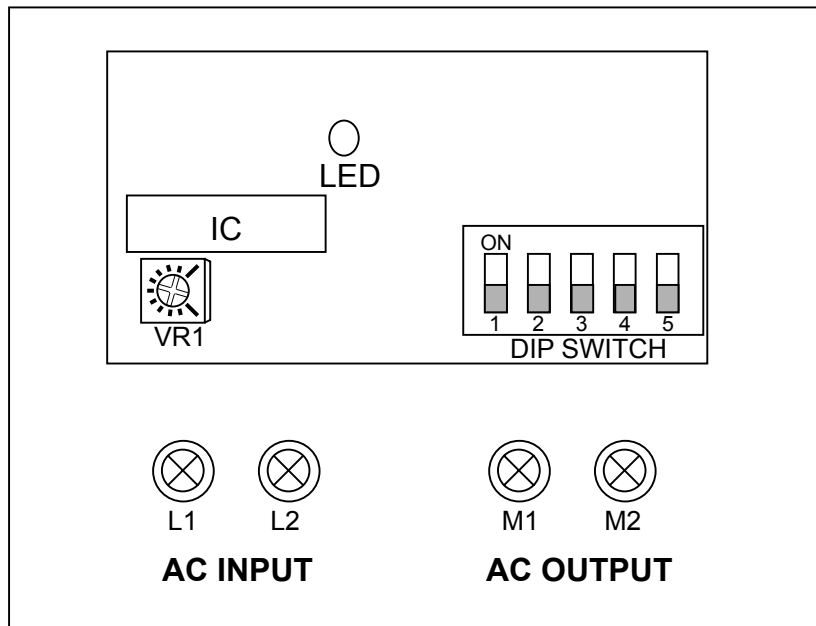


Fig. 5.4

### Dip Switch Setting:

Model: Rated Current		10Amps	15Amps	25Amps/40Amps	
DIP 1	Low Current	DIP-1 OFF 2 OFF	0.6 Amp	1.5 Amps	Not applicable
		DIP-1 OFF 2 ON	1.5 Amp	4.0 Amps	
DIP 2		DIP-1 ON 2 OFF	1.7 ~ 1.8 Amp	4.5 Amps	
		DIP-1 ON 2 ON	2.5 Amp	6.0 Amps	
DIP 3	Over High Current	DIP-3 ON 4 ON	10.0Amp(Default setting)	N/A	
		DIP-3 ON 4 OFF	8.0 Amp	15.0Amps(Default setting)	
DIP 4		DIP-3 OFF 4 ON	7.5 Amp	13.0 Amps	
		DIP-3 OFF 4 OFF	6.0 Amp	9.0 Amps	
DIP 5	Saving Mode	DIP-5 ON	Automatic(Default setting)		
		DIP-5 OFF	Semiautomatic		

#### 5.3.1 Delay Time Adjustment:

DIGITEK-IRC will be switched on with full voltage to the motor 3 seconds after the power is switched on. 6 seconds after the motor is started, DIGITEK-IRC will be switched to the saving mode. For special request with special need, the delay time can be preset differently according to the requirement for a large quantity application. During the delay start period, the LED flashes once every 0.5 second. During the delay saving period, the LED flashes once every 1 second. After the saving mode is switched on, the LED will stay on. The color of the LED is red or green depending on whether it is under semiautomatic saving mode or automatic saving mode.

#### 5.3.2 Energy Saving Adjustments:

- a. DIGITEK-IRC is preset for popular use. And no adjustment is allowed. Any adjustment should be done by a trained technical personnel authorized by DIGITEK.
- b. For DIGITEK-IRC the energy saving adjustment can be done by an authorized personnel for a better energy saving result. Remove the plastic cover of DIGITEK-IRC and make the adjustment as described below.
- c. For the same type of appliances, such as the same type of coolers, one may find out the best adjustment for the best saving of that type of coolers. This adjustment can be used for mass installation of DIGITEK-IRC in that type of appliances.
- d. Automatic saving and semiautomatic saving switching: DIP 5 ON is for

automatic saving and DIP 5 OFF is for semiautomatic saving.

e. VR adjustment

Semiautomatic Saving Mode (DIP 5 off, LED in red): At semiautomatic saving mode, the current and the output voltage will be decreased and the energy saving will be increased while VR is turned counterclockwise. However, if the voltage is dropped too much, the current will not be decreased accordingly, instead, the current will be increased. In this case, it will consume more energy, instead of saving energy. Therefore, turn VR to the right until the current starts to increase, and then turn a few degrees back. This should be the best position for VR at semiautomatic saving mode.

Automatic saving Mode (DIP 5 ON, LED in green): At automatic saving mode, the voltage will be increased as the load is increased and vice versa. To enhance the energy saving effect, one can make some adjustment on VR. At certain load, the energy saving will be increased as VR is turned counterclockwise. Usually, one may adjust VR at 10 o'clock as shown in Fig. 5.4. One can make some fine adjustment on VR so that the overall saving is the best.

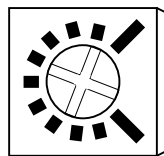


Fig. 5.4

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