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КОНТРОЛЛЕРЫ

Технические характеристики на DCP50, DCP551, DCP250

DCP50 Digital Controller Programmer

Specification

Overview

The DCP50 is a microprocessor-based 1/16 DIN controller programmer that combines a high degree of functionality and reliability at a low price. It is capable of supporting up to 4 program profiles with up to 16 segments per profile. It is fully dedicated to monitor and control temperatures, pressures and levels in a wide range of applications such as the plastics and food industries, furnaces, packaging and environmental chambers. The large and easy-to-read dual 4-digit display and tactile keypad make the DCP50 easy to configure and use. It's outstanding flexibility enables you to configure any unit for any application and change it if required.

Features

Dual Display
Two 4-digit displays with 7 LED segments, each configurable for:
- PV and SP (non adjustable)
- PV and SP (adjustable)
- PV and Ramping SP
- PV only

Programs / Segments
A maximum of 4 program profiles can be stored and up to 16 segments con be programmed to each profile.

Easy to Configure
Two different configuration levels (configuration mode and set-up mode) provide easy access to parameters. A 4-digit security code prevents unauthorized changes.

Moisture Resistant Front-face
Meets NEMA 3 / IP65 front-face protection against dust and water.

Universal Input
Accepts seven different types of thermocouples, RTDs, current and volt linear inputs. All inputs are configurable as standard.

Universal Power Supply
The DCP50 can operate on any line voltage from 90 Vac to 264 Vac at 50/60 Hz continuously. A 24/48 Vac/dc model is available as an option.

PC Software Tools
PC-based software is available for ease of configuration and monitoring.

Easy Output Selection and Upgrade
With only three basic modules (current, triac, and relay output) and plug-in options, you can configure the controller as you want for a wide range of applications.

Up to Three Outputs
The DCP50 provides up to three outputs for time and current proportioning, duplex mode (heat/cool), PV or SP retransmission, and events.

Event Strategy
Two soft event alarms on PV, deviation high/low/absolute. A special loop alarm is also provided to detect faults in the control loop by continuously analyzing the PV response to the control output. Alarm inhibit is available on power up and setpoint switching.

Manual/Automatic Mode
If enabled via configuration, Manual control (via bumpless transfer) is enabled by simply pressing the front-face SETUP key.

Pre-tuning and Self-tuning Strategy
Pre-tuning is used to set up the PID parameters close to the optimum values which might be used by the self-tuning algorithm to subsequently optimize the tuning parameters.

Guaranteed Soak
Guaranteed soak feature allows the profile to sense if the PV is in range of the end of a ramp before starting a soak.

Profile Recovery and Cycling
Profile recovery feature allows a 'cold start' or 'warm start'. Profile cycling provides a range from 'no cycling' to 'infinite cycling'.

Digital Input
The digital input option allows remote run / hold capability.

Communication
An optional RS485 communications interface provides a link between up to 32 units and a host computer through Modbus RTU protocol at up to 9600 baud.

Highly Secure
A non-volatile memory based on EEPROM technology ensures data integrity during loss of power supply, with retention of more than 100 years. The design is centered around a battery concept. A 4-digit security code prevents unauthorized or accidental change.

Optional Features

The following can be selected via the Model selection Guide (see page 7):
- RS485 Modbus RTU communication
- Digital Input (remote RUN/HOLD)
- Output 2
- Output 3
- Power Supply 24/48 Vac/dc

Physical Description

The DCP50 controller programmer is housed in a 110 mm (4.33 inches) deep case with the standard gray bezel. It can be mounted in a 1/16 DIN panel cutout. By using the pre-assembled mounting fixture delivered with the unit, you can easily and securely install the controller into the panel cutout. Modular plug-in construction allows rapid access and saves time. All inputs and outputs are connected on the rear terminal block by screws.

Operator Interface

Four display combinations are offered to the operator. The upper 4-digit 7-segment display is always dedicated to monitor the PV. The lower display can show:
- SETPOINT (read only)
- SETPOINT (adjustable)
- RAMPING setpoint (ramp mode)
- BLANK

UPPER DISPLAY - Four characters dedicated to show the PV. In configuration mode, it shows the parameter value or selection.

LOWER DISPLAY - Four characters dedicated in normal operation to display the setpoint. In configuration mode, it displays the parameter name.

RUN - LED indicates that the programmer is in the run mode.

AT - LED indicates that the controller is in self-tune mode. When flashing, controller is in pre-tune mode.

EVT - LED informs that event is on.

Figure 2 — Operator Interface

Key functions

RUN	Selects run or hold mode, can also abort program.
SET UP	Allows operator mode parameters to be scrolled. In combination with the “Upper” key, allows configuration mode or set-up mode to be entered.
▲	Increases setpoint, output or configuration parameter values.
▼	Decreases setpoint, output or configuration parameter values.

Universal Inputs

All input types are available on any unit. By positioning a jumper on the CPU board, the thermocouples, RTDs or linear input families can be field selected. Selection among the various types of inputs is made by prompt configuration. As soon as the Process Variables reaches a value of the input range limits, the controller displays a message. A sensor break indication is also provided. A configurable digital filter is available from 0.5 seconds to 100.0 seconds.

Outputs

Four types of outputs (Relay, Solid State Relay Driver, Solid State Triac, or Linear) are selectable for three outputs, through the model selection guide or by adding a plug-in module for outputs 2 and 3.

Output Algorithms

The DCP50 is available with the following output algorithms:

- *Time proportional:*
  ON/OFF or time proportional with electromechanical relay SPDT 2 A, solid state relay (SSR) driver (open collector), or solid state (SS) Triac.
- *Current proportional:*
  Supply directly proportional current or volt signal to the final control elements which require 0-20 mA, 4-20 mA, 0-10 V or 0-5 V.
- *Time proportional duplex:*
  Three duplex modes can be selected, either ON/OFF duplex or time proportional duplex (heat/cool with two proportional bands, two cycle times and deadband).
- *Current proportional duplex:*
  In addition to the first current/volt output, provides a second similar output with its own proportional band.
- *Current/Time or Time/Current duplex:*
  Provides a variation of traditional time or current duplex mode by mixing current and time proportioning together.

Control Algorithms

Three control algorithms can be set up through the configuration menu:

- On/Off
- PID
- PD + MR

Configuration

There are two levels of configuration. The SET-UP mode allows modification of current parameters such as tuning parameters, event alarm values, setpoint limit, ramp enable, auto-manual mode enable, auto pre-tune enable.

The CONFIGURATION mode is more oriented to unit personality: input selection, output 2 and 3 usage, event alarm type, communication address, lockout code, hardware definition coding.

Control Mode

In the base mode with no program running or held, Manual control may be selected via the Set Up key. Manual or automatic mode with bumpless transfer is standard feature. In manual mode, the operator can directly control the output through the two front face keys (raise and lower keys). The output value is monitored on the lower display.

Event Alarms

Outputs 2 and 3 can be used as event alarms. Two electromechanical single pole double throw relays can activate external equipment when event alarm setpoints are reached. An LED is also activated on the front-face. A direct or reverse acting event alarm output can be configured. A logical combination of the two event alarms: OR, AND or hysteresis (active when both event alarms are active, becomes inactive when both event alarms are inactive) can be set which associates the two event alarms status before energizing the relay. In order to detect a defective control loop, the controller can supply a special loop alarm control by continually monitoring the PV response to output demand. A timer is automatically set up when any output is on saturation mode. When the timer reaches twice the reset time with no PV response, then the loop alarm is activated. With this soft alarm, there is no need for a heater breaker, saving wiring time and costs.

Display

Dual, four-digit LED display with decimal point location configurable up to three places for linear ranges only.

PC Software Tools

The optional DCP50 Support Software kit provides a Windows-based configuration tool and a special hardware connector. The connector uses the serial port on a PC along with a standard connector on the underside of the DCP50 Programmer. The "Program Editor" portion of the software allows easy graphical set up of the setpoint profiles and features upload/download of programs, save program information to disk, and create hard copy of profile information. The "Configurator" portion of the software allows instrument configuration. This software does not require the RS485 communications option.

Specifications

Technical data

Accuracy	0.25 % of span ± 1 LSD
Number of Programs	4 maximum
Number of Segments	16 per program maximum
Segment Time	0 to 99 hours 59 minutes; or 0 to 99 minutes 59 seconds (time unit selectable)
Guaranteed Soak	Sets Guaranteed Soak width 0 to 1000 U
Cycle	Sets program count 0 to 9999 or INF (infinite)
Pattern Link	Sets program number 0 to 4 (0: no link)
Temperature Stability	0.01 % of span per ºC
Input Signal Failure	*Fail-safe output value:* Achieved when burnout is detected. Value depends on configuration. *For thermocouple and mV input detected by any lead break:* Upscale burnout *For RTD:* Burnout detected by any lead break *Current or volt input:* Burnout set by open circuit detection
Input Impedance	*Volt impedance:* 47 Kohms *Current input:* 4.7 ohms *All others:* 100 Mohms
Input Sampling Rate	Four samples per second
Input Filter	Digital filter configurable from front panel 0.0 (Off), from 0.5 seconds to 100.0 seconds in 0.5 seconds increment
Input Resolution	14 bits approximately, always four times better than display resolution
Input Isolation	Universal input isolated at 2500 V from all outputs except SSR and from power supply
Stray Rejection	*Common mode rejection:* > 120 dB at 50/60 Hz *Serial mode rejection:* > 500% of span at 50/60 Hz
Approvals	UL, Product design to meet CE MARK requirement
Control Output Type	***Type available:*** *Outputs 1 and 2:* Linear, Electromechanical relay, Solid state relay drive (open collector), Solid state Triac *Output 3:* Linear (retransmission only), Electromechanical relay, SSR drive (open collector) ***Linear output:*** 0-20 mA, 4-20 mA, 0-5 V, 0-10 V (field configurable) *Accuracy:* ± 0.5 % (250 ohms for mA, 2 Kohms for volt) *Resolution:* 80 bits in 250 ms (10 bits in 1 second typical >10 bits in >1 second) *Load impedance:* 500 ohms max current output, 500 ohms min volt output *Isolation:* Isolated 2500 V from all other inputs and outputs *Range selection method:* Jumper positioning and front panel code setting *Temperature stability:* 0.01 % / °C ***Electromechanical relay:*** SPDT contact *Resistive load:* 2 A at 120 V or 240 V *Life time:* > 500000 operations at rated voltage/current ***Solid state relay drive/TTL:*** *Drive capability:* SSR > 4.3 Vdc into 250 ohms minimum *Isolation:* Not isolated from input and other SSR output ***Solid state Triac:*** *Operating voltage range:* 20-28 Vrms (47-63 Hz) *Current rating:* 0.01-1 A (full cycle rms on-state @ 25 °C) *Maximum non-repetitive surge current (16.6ms):* 25 A peak *OFF-state min. dv/dt & max. leakage @ rated voltage:* 500 V/µs and 1mA rms *OFF-state repetitive peak voltage, Vdrm:* 600 V minimum *ON-state max. voltage drop @ rated current:* 1.5 V peak

Technical data (continued)	
Event Alarms	*Maximum number of event alarms:* 2 soft event alarms setpoint + 1 loop alarm Event alarm inhibit available on power up and setpoint switching *Event alarm output:* Up to two relays or SSR output on outputs 2 and 3 *Types:* PV high or low, band, deviation high or low, loop *Combination event alarms:* Logical “OR”, “AND” or hysteresis of event alarms available to individual hardware output
Loop Control	*Automatic tuning type:* Pre-tune and self-tune *Proportional bands:* 0 (inactive), 0.5 % to 999.9 % of input span with 0.1% increments. Two proportional bands available for duplex mode *Reset:* Off or from 1s to 99 min 59 s *Rate:* From 0 s to 99 min 59 s *Manual reset:* from 0 to 100 % of output (single output), from –100 % to 100 % of output (dual output) *Deadband:* ± 20 of PB1 + PB2 *ON/OFF hysteresis:* 0.1% to 10.0 % of input span *Auto/manual mode:* Front key selectable with bumpless transfer between automatic and manual mode *Cycle times:* Up to two cycle times available for time duplex control *Selection:* 0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, or 512 seconds *Setpoint ramp:* From 1 to 9999 engineering units per hour
Retransmission Output	Current and volt output of output 3 can be selected to retransmit the process value or setpoint
Communication Interface	RS485 Modbus RTU *Baud rate:* 1200, 2400, 4800 or 9600 baud *Link characteristics:* 32 drops maximum, Modbus protocol, two wires
Mounting	Plug-in with pre-assembled mounting fixture
Wiring Connection	Screw terminals on the rear of the case (combination head)
Power Consumption	4 W
Physical	*Weight:* 210 grams maximum *Height:* 48 mm / 1.89 in *Width:* 48 mm / 1.89 in *Depth:* 110 mm / 4.33 in *Cut out:* 45 mm x 45 mm / 1.77 in x 1.77 in
Environmental	*EMI Susceptibility:* Designed to meet EN55101 *EMI Emission:* Designed to meet EN55022 *Safety Considerations:* Designed to comply with IEC1010-1as far as applicable
Front Panel Sealing	NEMA 3 / IP65

Universal Input Actuations

		Ranges	
Thermocouple types		**°F**	**°C**
(Fixed decimal)	**R**	32 – 3002	0 – 1650
	S	32 – 3000	0 – 1649
	J	32.0 – 401.7	0.0 – 205.4
	J	32 – 842	0 – 450
	J	32 – 1401	0 – 761
	T	-328 – 503	-200 – 262
	T	32 – 501.0	0– 260.6
	K	-328 – 1399	-200 – 760
	K	-328 – 2503	-200 – 1373
	L	32 – 402.2	0.0 – 205.7
	L	32 – 841	0 – 450
	L	32 – 1403	0 – 762
	B	211 – 3315	100 – 1824
	N	32 – 2550	0 – 1399
	C/W5	32-4201	0-2316
RTD (3 wires connection)		**°F**	**°C**
PT100 (IEC) α = 0.00385 (Fixed decimal)		32 – 1471	0 – 800
		32 – 571	0 – 300
		-149.7 – 211.9	-100.9 – 100.0
		32 – 213.6	0.0 – 100.9
		-328 – 402	-200 – 206
		-149.7 – 999.1	-100.9 – 537.3
Linear (Current and Voltage)		10 – 50 mV	0 – 50 mV
		4 – 20 mA	0 – 20 mA
		1 – 5 V	0 – 5 V
		2 – 10 V	0 – 10 V

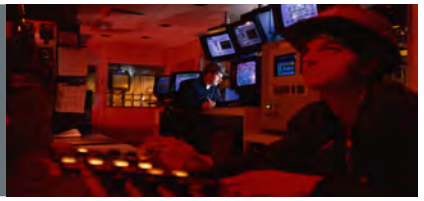
All inputs noted above are field configurable.

Operating Conditions

	Reference Conditions	**Operative Limits**	**Transportation and Storage**
Ambient Temperature	20 °C ± 2 °C (68 °F ± 4 °F)	0 °C to 55 °C (32 °F to 131 °F)	–20 °C to 80 °C (–4 °F to 176 °F)
Relative Humidity	60-70 %	20-95 % non -condensing	
Voltage	90-264 Vac ± 1 %	90-264 Vac	
Frequency	50 Hz	50-60 Hz	
Source Resistance	< 10 ohms for thermocouple	1000 ohms maximum for thermocouple	
Lead resistance for RTD	< 0.1 ohm/lead (PT100)	50 ohms per lead maximum balanced	

Technical Information

DCP250 Single or two loop controller and programmer with graphic display Specification 57-77-03-18



Introduction

DCP250 is a 1/4 DIN controller programmer with a graphical text display, advanced control capability and modular I/O options providing flexibility to fit a wide range of industrial manufacturing and process applications.

Fast and easy front panel setup for simple and advanced control tasks

DCP250 simplifies user setup with a step by step wizard configuration saving working through several menus for initial setup. A logical menu structure for intuitive navigation allows fast changes and updates to individual settings.

Configure controllers without connecting to a PC

Configuration files can be downloaded to a controller using a flash memory stick via the front USB port allowing for fast programming. Settings can also be read via the USB port to clone additional devices or configure a replacement. Datalog files can also be extracted locally via the USB for convenient access of process data.

Easy access user operation

The DCP250 pages are formatted to show users important process information on a single page, minimizing the steps to access data and settings. A color change green/red LED backlight provides easily recognizable alarm indication to improve response times for corrective action.

Comprehensive control ….. and much more

DCP250 includes many features to ensure good control performance on a wide range of applications.
Single or dual loop capability in a single device, cascade, valve and ratio enhanced control with support features such as real time clock timer; gain scheduling and profiler ensure DCP250 has the flexibility for process system needs. In addition, datalogging, trending, USB, Ethernet options add even more capability to an already powerful device.

Fast configuration via configuration interface

Direct access for programming is available via a top of the controller connection port. The interface provides easy and fast access with Blue Control software to configure the controller or drilldown into process issues with minimal disruption.

Figure 1– DCP250 Controller Programmer

Key features

- 1/4 DIN size
- Single or Two Loop (1 or 2 control loops)
- Graphical / Text LCD Display (red/green)
- USB host for configuration (read/write) and logged data (read)
- Profiler 256 segments shared in 64 programs
- Datalogger function with real time clock
- Modbus RS485 or Modbus TCP Ethernet
- Standard CE, UL
- ON/OFF, PID heat only & Heat/Cool, Valve Motor Drive, Ratio Cascade Control
- 255 segment profiler shared in 64 programs
- 5 PID sets for manual or automatic gain scheduling
- 7 Alarms – absolute, deviation, rate of change, sensor break, recorder memory, power
- Ethernet – Modbus TCP, RS485 - Modbus RTU (Master/Slave)
- Up to to 2 analog inputs, 9 outputs, remote setpoint input, 9 digital inputs

Performance Specifications[1]

UNIVERSAL INPUT 1 AND 2

Sampling Rate: 10 per second.

Resolution: Impedance: 16 bits. Always four times better than display resolution.

Temp Stability: Supply >10MΩ resistive, except DC mA (5Ω) and V (47kΩ).

Variation: Humidity Error <0.01% of span per ℃ change in ambient temperature.

Influence: Process Supply voltage influence negligible within supply limits.

Display: Process Negligible if non-condensing.

Variable Input Offset: Displays up to 5% over and 5% under span limits.

Sensor Break Detection: Reading adjustable ± Controller Span. +ve values added to Process Variable, -ve values subtracted from Process Variable

Thermocouple & RTD - *Control goes to pre-set power value. High & Sensor Break alarms activate.*

Isolation: Linear *(*4 to 20mA, 2 to 10V & 1 to 5V only) - *Control goes to pre-set power value. Low & Sensor Break alarms activate.*

Supported Thermocouple Types & Ranges: Reinforced safety isolation from outputs and other inputs

Type	Range ℃	Range ℉	
B	+100 to 1824℃	+211 to 3315℉	
C	0 to 2320℃	32 to 4208℉	
D	0 to 2315℃	32 to 4199℉	
E	-240 to 1000℃	-400 to 1832℉	
J	-200 to 1200℃	-328 to 2192℉	*
K	-240 to 1373℃	-400 to 2503℉	*
L	0 to 762℃	32 to 1402℉	*
N	0 to 1399℃	32 to 2551℉	*
PtRh 20%:40%	0 to 1850℃	32 to 3362℉	
R	0 to 1759℃	32 to 3198℉	
S	0 to 1762℃	32 to 3204℉	
T	-240 to 400℃	-400 to 752℉	*
Optional decimal place can be displayed on all ranges			

Thermocouple Calibration: ±0.1% of full range, ±1LSD (±1℃ for internal CJC if enabled).

Linearization better than ±0.2℃ (±0.05 typical) on ranges marked * in the table above. Linearization for other ranges is better than ±0.5℃.

Supported RTD Types & Ranges: BS4937, NBS125 & IEC584

Type	Range ℃	Range ℉
3-Wire PT100	-199 to 800℃	-328 to 1472℉
NI120	-80 to 240℃	-112 to 464℉
Optional decimal place can be displayed on all ranges		

RTD Calibration: 0.1% of full range, ±1LSD.

RTD Excitation: Linearization better than ±0.2℃ (±0.05 typical). PT100

Lead Resistance: input to BS1904 & DIN43760 *(0.00385Ω/Ω/℃).*

Supported Linear Types & Ranges: Sensor current 150□A ±10%.

<0.5% of span error for max 50Ω per lead, balanced.

Type	Range	Offset Range
mA DC	0 to 20mA DC	4 to 20mA DC
mV DC	0 to 50mV DC	10 to 50mV DC
V DC	0 to 5V DC	1 to 5V DC
V DC	0 to 10V DC	2 to 10V DC
Potentiometer	≥100 ohms	N/A
Scalable from -2000 to 100000. Decimal point selectable from0 to 3 places, but rounds to 2 places above 99.999; 1 place above 999.99 and no decimal above 9999.9.		

Maximum Overload: DC 1A on mA input terminals, 30V on voltage input terminals.

Calibration: ±0.1% of full range, ±1LSD.

DC Input Multi-Point Linearization: Up to 15 scaling values can be defined anywhere between 0.1 and 100% of input.

Input Functions:

Function	Input 1	Input 2
Process Control	Loop 1	Loop 2
Cascade Control	Slave Loop	Master Loop
Ratio Control	Controlled Variable	Un-controlled Variable
Remote Setpoint (RSP)	-	RSP on loop 1
Valve Position Feedback	-	Valve on loop 1
RSP Linear inputs only, scalable between -9999 to 10000, but actual setpoint value is kept within the setpoint limit settings		

#AUXILIARY INPUT A

Supported Input Types & Ranges:

Type	Range	Offset Range
MA DC	0 to 20mA DC	4 to 20mA DC
V DC	0 to 5V DC	1 to 5V DC
V DC	0 to 10V DC	2 to 10V DC

Accuracy: ±0.25% of input range ±1 LSD.

Sampling Rate: 4 per second.

Resolution: Impedance: 16 bits.

Sensor Break Detection: >10MΩ resistive, except DC mA (10Ω) and V (47kΩ).

Isolation: 4 to 20mA, 2 to 10V and 1 to 5V ranges only. *Control goes to pre-set power value if Aux Input is the active setpoint source.*

Input Function: Reinforced safety isolation from outputs and inputs.

Remote Setpoint (RSP) input, Scalable between ±0.001 & ±10000, but always constrained by the setpoint limit settings.

DIGITAL INPUTS A & C

Selectable Digital Input Functions:

	Function	Logic High*	Logic Low*
	Loop 1 Control Select	Enabled	Disabled
	Loop 2 Control Select	Enabled	Disabled
	Loop 1 Auto/Manual Select	Automatic	Manual
	Loop 2 Auto/Manual Select	Automatic	Manual
	Loop 1 Setpoint Select	Main SP	Alternate SP
	Loop 2 Setpoint Select	Main SP	Alternate SP
	Loop 1 Pre-Tune Select	Stop	Run
	Loop 2 Pre-Tune Select	Stop	Run
	Loop 1 Self-Tune Select	Stop	Run
	Loop 2 Self-Tune Select	Stop	Run
	Profile Run/Hold	Hold	Run
	Profile Hold Segment Release	Release	*No Action*
	Profile Abort	Abort	*No Action*
	Data Recorder Trigger	Not Active	Active
	Output *n* Forcing Open/Close	Open	Closed
	Clear All Latched Outputs	*No Action*	Reset
	Output *n* Clear Latch	*No Action*	Reset
	Key *n* Mimic (for L D U R)	*No Action*	Key Pressed
	nputs C1-C7 can be used as Binary or BCD Profile Selection	Binary 0	Binary 1
The High/Low function can be switched using Inputs to Invert.			

Digital Input Sensitivity: Inputs work in parallel with equivalent menus, either can change function status. Response <0.25 second.

▉ = Level Sensitive: High or low sets status.

= Edge Sensitive: High-Low or Low-High transition changes function. Pre-Tune always off at power on (except auto pre-tune), but others retain their power off status at power on.

Std. Logic State: Volt-free (or TTL): Open contacts (>5000Ω) or 2 to 24VDC signal = Logic High

Closed contacts (<50Ω) or -0.6 to +0.8VDC signal = Logic Low.

Inverted Logic: *Open contact (>5000Ω) or 2 to 24VDC signal = Logic Low*

Closed contact (<50Ω) or -0.6 to +0.8VDC signal = Logic High.

Number Available 0 to 9. One from Module Slot A, 8 from Multi-Digital Input C

Isolation: Reinforced safety isolation from inputs and outputs.

DCP551 Digital Control Programmer

Specification and Model Selection Guide

Introduction

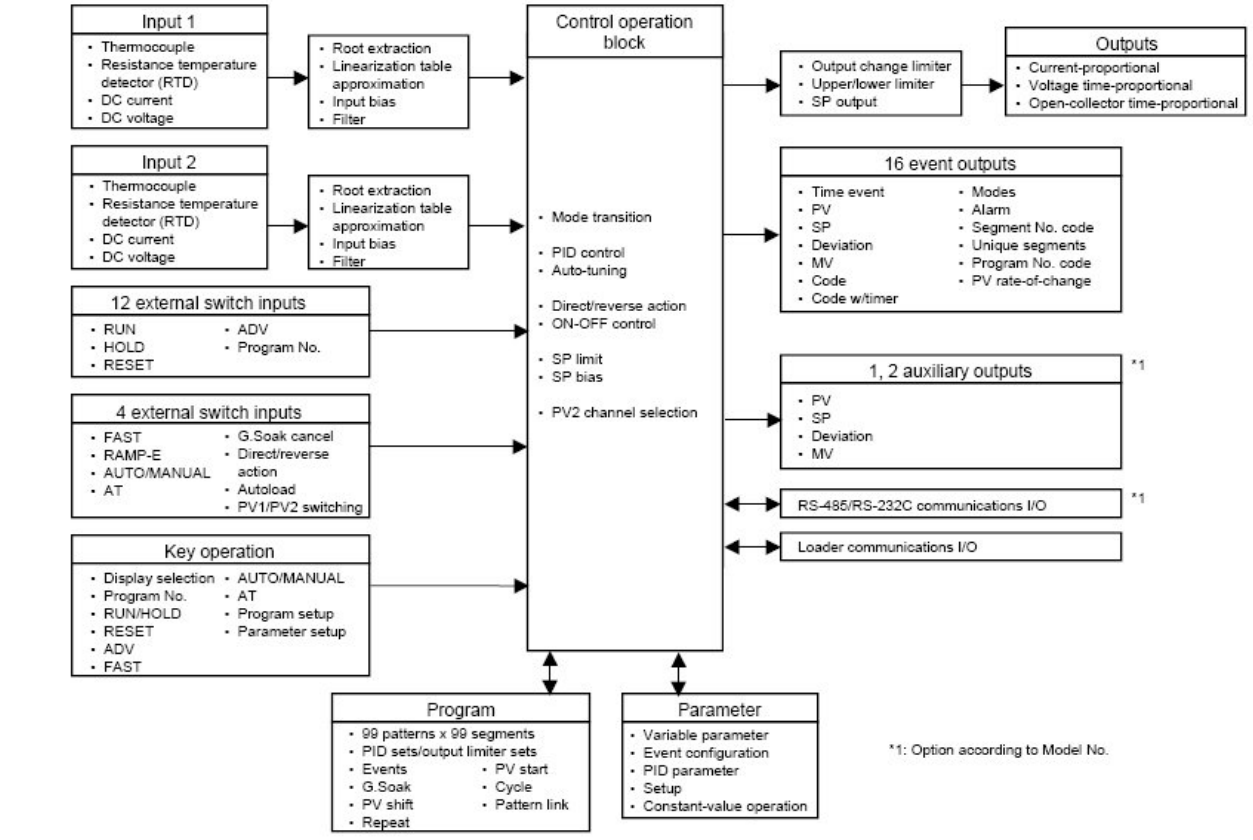
The DCP551 is a high-function programmer/controller supporting up to 99 program patterns to which thermocouple, resistance temperature detector (RTD), DC voltage, DC current and other signals can be input.

The DCP551 supports: 16 event outputs, 16 external switch inputs and a wide range of other functions as part of the standard specification; and communications and auxiliary output as option functions.

- *Accuracy of ±0.1 % FS. Easy-to-view large display characters. Compact design*
- *2 PV input type also available*
- *Any input type can be selected by console key operation. Easy operation aided by guidance messages*
- *Up to 99 program patterns can be stored and up to 99 segments can be programmed to each pattern.*
- *Various events can be selected and set for the 16 event outputs, and code events comprising a combination of two or more points can be set.*
- *16 external switch inputs allow the control of remote selection of program Nos. or operation.*
- *CE marking-compatible*
  Applicable standards: EN61010- 1

Figure 1—DCP551 – Digital Control Programmer

BASIC FUNCTION BLOCKS of DCP551



Specifications

Program	**Number of programs**	99
	Number of segments	99 per program, 2000 per controller
	Segment setting system	RAMP-X: Set by set points (SP) and time. RAMP-T: Set by set points (SP) and ramp (Θ) RAMP-E Set by set points (SP) and Δ SP per external switch input 1
	Segment time	0 to 500 hours 0 minute, 0 to 500 minutes 0 second, 0.0 to 3000.0 seconds (time unit selectable)
	Segment ramp	1 to 10000 U/hour, 1 to 10000 U/minute, 1 to 10000 U/second (time unit selectable)
	Segment ΔSP	1 to 10000 U/l pulse
	Number of sub-functions	4000 settings per controller
	Sub-function action	Events, PID set, output limiter set, G, Soak, PV shift, repeat
	Events (16)	Set operating point corresponding to event type
	PID set No.	Set 0 (continuation of previous segment), 1 to 9, A set (automatically switched) and ON-OFF control
	Output limiter set	Set 0 (continuation of previous segment), 1 to 9
	G.Soak	Set type (start/end points and overall) and G.Soak width 0 to 1000 U.
	PV shift	-10000 to +1 0000 U
	Repeat	Set return destination segment No. and repeat count.
	PV start	Set type (rising/falling or both) for each program.
	Cycle	Set cycle count for each program.
	Pattern link	Set program No. 0 to 99 (0: no link) for each program.
	Tag	Set 8 alpha-numeric's or symbols for each program.
	Basic time accuracy	± 0.01 % (segment time setting = 0, with 0.1 second delay for each repeat and cycle)
Inputs	**Input type**	Thermocouple, resistance temperature detector (RTD), DC voltage, DC current multi-range (See pages 6, 7.)
	Sampling cycle	0.1 seconds
	Input bias current	Thermocouple~DC voltage input: Max. ±1.3 μA (at peak value and reference conditions) 1 V or higher range: Max. -3 μA
	Input impedance	DC current input: approx. 50 ohms (under operating conditions)
	Measuring current	RTD input: Approx. 1 mA current flow from terminal A (under operating conditions)
	Influence of wiring resistance	Thermocouple, DC voltage input: Thermocouple: 0.5 μV/ohm DC voltage (max. 1 V range): 0.5 μV/ohm DC voltage (5 V range): 3 μV/ohm DC voltage (10 V range): 6 μV/ohm RTD input: Max. ±0.01%FS/ohm in wiring resistance range 0 to 10 ohm Range of F01, F33, P01 and P33:±0.02%FS/ohm max.
	RTD input allow- able wiring resistance	Ranges other than FO1, F33, PO1 and P33: 65 ohms max. (including Zener barrier resistance. Note that site adjustment is required.) Ranges of FO1, F33, PO1 and P33: 10 ohms max. (Zener barrier cannot be used.)
	Allowable parallel resistance	Thermocouple disconnection detection allowable parallel resistance: 1 Mohm min.
	Max. allowable input	Thermocouple, DC voltage input: -5 to +15V dc DC current input: 50 mA dc, 2.5V dc
	Burnout	Detection selectable
	Over-range detection threshold	110% FS min.: Upscaled -10% FS max.: Downscaled (Note that F50 range is not downscaled.)
	Cold-junction compensation accuracy	±0.50°C (under standard conditions)
	Cold-junction compensation system	Internal/external (0°C only) compensation selectable

Inputs	**Scaling**	-19999 to +20000 U (possible in case of linear input only. Inverse scaling possible. Decimal point position settable at any point)
	Square root extraction	Possible. Dropout: 0.2 to 10.0% in case of DC current or DC voltage range
	PV equalizer (linearization table approximation)	PV1: 9 segments (10 points set) PV2: 19 segments (20 points set)
	Input bias	-1000 to +1000 U variable
	Digital filter	0.0 to 120.0 seconds variable (0.0: filter OFF)
External switch inputs	**Number of Inputs**	16
	Types of connect-able outputs	Dry contacts (relay contact) and open-collector (current sink to ground)
	Terminal voltage (open)	8.5 V ±0.5 V between common terminals (terminals 12, 40) and each input terminal (under operating conditions)
	Terminal current (short-circuit)	Approx. 6 mA between each terminal (under operating conditions)
	Allowable contact resistance (dry contact)	ON: 250 Ω max. (under operating conditions) OFF: 100 kΩ min. (under operating conditions)
	Voltage drop (at open-collector ON)	2 V max. (under operating conditions)
	Leakage current (at open-collector OFF)	0.1 mA max. (under operating conditions)
	Assignments (fixed)	RUN, HOLD, RESET, ADV, program No.
	Assignments (variable)	RAMP-E, FAST, AT, AUTO/MANUAL, G.Soak cancel, direct/reverse action, auto-load, PV1/2 switching
	Input sampling cycle	0.1 seconds
	ON detection min. hold time	0.2 seconds (0.4 seconds for program No.)
Indication/Programmer	**Upper display**	Green 5-digit, 7-segment LED This displays PV values in the basic display state. Item codes are displayed in the parameter setup.
	Lower display	Orange 5-digit, 7-segment LED This displays SP and output % in the basic display state. Setting values are displayed in the parameter setup.
	Program No. display	Green 2-digit, 7-segment LED This displays program No. in the basic display state.
	Segment No. display	Green 2-digit, 7-segment LED This displays segment No. in the basic display state. Item Nos. are displayed in parameter setup, and alarm No. is displayed when alarm occurs.
	Message display	This displays output graph, deviation graph, event state and tags in the basic display state. This displays reference messages in the parameter setup and program setup. This displays operation details and operation results of memory card operation.
	Profile display	7 orange LEDs Displays program pattern rise, soak and fall trends.
	Status displays	22 round LEDs Modes: RUN, HLD, MAN, PRG (green) Display details: PV, SP, OUT, TM, CYC, SYN, DEV (green) Battery voltage: BAT (red) (blinks at low voltage) Status: AT (green) Events: EG1, EG2 (red)
	Operation keys	16 rubber keys
	Loader connector port	1 (dedicated cable with stereo miniplugs)

Modes	**Program operation modes**	READY: RUN: HOLD: FAST: END: READY FAST:	Ready to run program (control stop/program No. selectable) Program run Program hold Program fast-forward Program end Ready to run and fast-forward program
		AUTO: MANUAL:	Automatic operation Manual operation (output can be controlled on console)
	Constant-value operation modes	READY: RUN:	Ready to run program (control stop) Program run
		AUTO: MANUAL:	Automatic operation Manual operation (output can be controlled on console)
Controller	**PID controls**	Proportional band (P)	0.0 to 1000.0% (0.0: ON-OFF control)
		Reset time (1)	0 to 3600 seconds. 0 seconds: PD control
		Rate time (D)	0 to 1200 seconds. 0 seconds: PI control
		MV limit	Lower limit: -5.0 to upper limit % Upper limit: Lower limit to +105.0%
		Manual reset	0.0 to 100.0%
	PID controls	Number of PID sets	16 sets for program operation (9 segment unique sets+ 7 sets for automatic zone selection)
		PID set selection	Segment designation/automatic zone selection can be switched by program operation.
		MV change	0.1 to 110.0%/0.1 seconds
		Auto-tuning	Automatic setting of PID value by limit cycle system
		ON-OFF control differential	0 to 1000 U
	Direct/reverse actionswitching	Possible	
	Programmer function	Switching	MV output switchable to SP output
		Scaling	ossible
		Output resolution	1/1 0000
Outputs	**Auxiliary output**	Output types	PV, SP, deviation, MV, PV1, PV2
		Scaling	ossible
	Current output (5G) auxiliaryoutputs CH1, CH2	Output current: Allowable load resistance: Output accuracy: Output resolution: Max. output current Min. output current Output updating cycle: Open terminal voltage:	4 to 20 mA dc 600 Ω max. (under operating conditions) ±0.1 % FS max. (under standard conditions) 1/1 0000 21.6 mA dc 2.4 mA dc 0.1 seconds 25 V max.
	Voltage output (6D)	Allowable load resistance: Load current adjustment: Variable open terminal voltage: OFF leakage current Output response time: Output resolution: Time-proportional cycle:	600 Ω max. (under operating conditions) 2 to 22 mA variable 25 V max. 100 μA max. At ON-OFF 600 Ω load: 0.5 ms max. At OFF-ON 600 Ω load: 0.5 ms max. 1/1000 1 to 240 seconds variable
	Open-collector output (8D)	External supply voltage: Max. load current: OFF leakage current ON residual voltage: Output resolution: Time-proportional cycle:	12 to 24V dc 100 mA/load 0.1 mA max. 2 V max. 1/1000 1 to 240 seconds variable
	Open-collector output	External supply voltage: Max. load current: Max. common current: OFF leakage current: ON residual voltage:	12 to 24V dc 70 mA/load 500 mA 0.1 mA max. 2 V max.

Event outputs	**Event types**	PV type	PV, deviation, w/ deviation standby, absolute value deviation, w/absolute value deviation standby, PV rate-of-change, SP, MV, G.Soak absolute value deviation w/ G.Soak absolute value deviation standby, PV1 constant operation, PV2 constant operation, difference between PV1-PV2 at channel switching, difference between PV1-PV2
		Time type	Time events, RAMP-E time monitor, segment time, program time
		Code type	Code event, code event w/ timer, program No. binary code, segment No. binary code, program No. BCD code, segment No. BCD code
		Mode type	Unique segment, RUN+ HOLD+ END+ FAST, HOLD, READY+READY FAST, END, G.Soak standby, MANUAL, AT executing, FAST+READY FAST, console operation in progress, RUN, advance, all alarms, PV range alarm, controller alarm, PV1 currently selected, PV2 currently selected, low battery voltage
	Event Hysteresis	In case of PV type set, 0 to 1000 U	
	Event ON delay	0.0 to 3000.0 can be set to four events	
Communications	**RS-485**	Network	Multidrop This controller is provided with only slave instrument functionality. 1 to 16 units max. (DIM) 1 to 31 units max. (CMA, SCM)
		Data fiow	Half duplex
		Synchronization	tart-stop synchronization
		Transmission system	Balanced (differential)
		Data line	Bit serial
		Signal line	5 transmit/receive lines (3-wire connection also possible)
	RS-485	Transmission speed	1200, 2400, 4800, 9600 bps
		Transmission distance	500 m max. (total) (300 m max. for MA500 DIM connection)
		Other	Conforming to RS-485 interface specifications
		Char. bit count	11 bits/character
		Format	1 start bit, even parity, 1 stop bit; or 1 start bit, no parity, and 2 stop bits
		Data length	8 bits
		Isolation	All inputs and outputs are completely isolated except external switch inputs.
	RS-485 communications can be performed by connecting to a computer equipped with an RS-485 interface		
	RS-232C	Network	1:1 Connected, This controller is provided with only slave instrument functionality.
		Data flow	Half duplex
		Synchronization	rt-stop synchronization
		Transmission system	Unbalanced type
		Data line	Bit serial
		Signal line	3 transmit/receive lines
		Transmission speed	1200, 2400, 4800, 9600 bps
		Transmission distance	15 m max.
		Other	Conforming to RS-232C interface specifications
		Char. bit count	11 bits/character
		Format	1 start bit, even parity, 1 stop bit; or 1 start bit, no parity, and 2 stop bits
		Data length	8 bits
		Isolation	All inputs and outputs are completely isolated except external switch inputs.

General Specifications	**Memory backup**	Memory Battery backed up RAM Battery life Controller power OFF: Approx. 5 years under standard conditions Controller power ON: Approx. 10 years under standard Conditions	
	Rated power voltage	100 to 240V ac, 50/60 Hz	
	Power consumption	25 VA max.	
	Power ON rush current	50A max.	
	Power ON operation	Reset time: 10 seconds max. (time until normal operation is possible under normal operating conditions.	
	Allowable transient power loss	20 ms max. (under operating conditions)	
	Insulation resistance	Min. 50MΩ across power terminal 39 or 40 and FG terminal 52 or 53 (by 500V dc megger)	
	Dielectric strength	1500V ac 50/60 Hz for 1 minute between power terminal and FG terminal Note) The primary side and secondary side capacities are joined inside the product. For this reason, when carrying out a withstand voltage test, disconnect the wiring of the grounded secondary side terminals (e.g. when grounding type thermocouple is used) from that terminal. If the test is carried out with the wiring as it is, this might result in malfunction.	
General Specifications	**Standard conditions**	**Ambient temperature**	23 ±2°C
		Ambient humidity	60±5%RH
		Rated power voltage	105V ac±1%
		Power frequency	50±1Hz. Or 60+/-1Hz
		Vibration resistance	0 m/s^2
		Shock resistance	0 m/s^2
		Mounting angle	Reference plane (vertical) ±3
	Operating conditions	**Ambient temperature**	0 to 50°C (ambient temperature at the bottom side of case when gang mounted)
		Ambient humidity range	10 to 90%RH (condensation not allowed)
		Rated power voltage	100 to 240V ac
		Allowable power voltage	90 to 264V ac
		Power frequency	50±2 Hz, or 60±2Hz
		Vibration resistance	0 to 1.96 m/s^2
		Shock resistance	0 to 9.80 m/s^2
		Mounting angle	Reference plane (vertical) ±10°
	Transport/storage conditions	**Ambient temperature range**	-20 to +70 °C
		Ambient humidity range	10 to 95%RH (condensation not allowed)
		Vibration resistance	0 to 4.90 m/s^2 (10 to 60 Hz for 2 hours each in X, Y and Z directions)
		Shock resistance	0 to 490 m/s^2 (3 times vertically)
		Package drop test	Drop height: 60 cm (1 angle, 3 edges and 6 planes; free fall)
	Terminal screw	M3.5 self-tapping screws	
	Terminal screw Tightening torque	0.78 to 0.98 Nm	
	Mask/case materials	Mask: MultiIon Case: MultiIon	
	Mask/case color	Mask: Dark gray (Munsell 5Y3.5/1), Case: Light gray (Munsell 2.5Y7.5/1)	
	Installation	Specially designed mounting bracket	
	Weight	1.5 kg	

Standard accessories	**Item**	**Model No.**	**Q'ty**
	Unit indicating label	**—**	1
	Mounting bracket	**81446044-001**	1 set (2 pieces)
	User's Manual	**CP-UM-5005E**	1

Auxilliary parts (sold separately)	**Item**	**Mode No.**	**Q'ty**
	Soft dust-proof cover set	81446141-001	
	Lithium battery set	81446140-001	rox.200 g

- **Thermocouple**

	Input Type		Input Range	(FS)	Accuracy (under standard conditions)	
Symbol	**C**	**Range No.**	**°C**	**°F**		
K (CA)	K46	16	–200.0 to +200.0	–300.0 to +400.0	±0.1 % FS	
K (CA)	K09	0	0.0 to 1200.0	0 to 2400	±0.1 % FS	
K (CA)	K08	1	0.0 to 800.0	0 to 1600	±0.1 % FS	
K (CA)	K04	2	0.0 to 400.0	0 to 750	±0.1 % FS	
E (CRC)	E08	3	0.0 to 800.0	0 to 1800	±0.1 % FS	
J (IC)	J08	4	0.0 to 800.0	0.0 to 1600	±0.1% FS	
T (CC)	T44	5	–200.0 to +300.0	–300 to +700	±0.1% FS	±0.3% FS between –200°C WR –45°C
B (PR30-6)	B18	6	0.0 to 1800.0	0 to 3300	±0.1% FS	±4.0% FS between 0 to 260° C ± 0.15% FS between 260 to 800°C
R (PR13)	R16	7	0.0 to 1600.0	0 to 3100	±0.1% FS	
S (PR10)	S16	8	0.0 to 1600.0	0 to 3100	±0.1% FS	
W (WRe5-26)	W23	9	0.0 to 2300.0	0 to 4200	±0.1% FS	
W (WRe5-26)	W14	10	0.0 to 1400.0	0 to 2552	±0.1% FS	
PR40-20	D19	11	0.0 to 1900.0	0 to 3400	±0.2% FS	±0.9% FS between 0 to 300°C ± 5% FS between 300 to 800°C
N	U13	12	0.0 to 1300.0	32 to 2372	±0.1% FS	
PLII	Y13	13	0.0 to 1300.0	32 to 2372	±0.1% FS	
Ni-Ni-Mo	Z13	14	0.0 to 1300.0	32 to 2372	±0.1% FS	
Golden iron chromel	Z06	15	0.0 to 300.0 K (K = Kelvin)		±0.4% FS	

- **Resistance temperature detector (RTD)**

Input Type			Input Range (FS)		Accuracy (under standard conditions)	
Symbol	**Cod**	**Range No.**	**°C**	**°F**		
JIS'89Pt100 (IEC Pt100 Ω)	F50	64	–200.0 to +500.0	–300.0 to +900.0	±0.1% FS	
	F46	65	–200.0 to +200.0	–300.0 to +400.0	±0.1% FS	
	F32	66	–100 to +150.0	–150.0 to +300.0	±0.1 % FS	
	F36	67	–50.0 to +200.0	–50.0 to +400.0	±0.1 % FS	
	F33	68	–40.0 to +60.0	–40.0 to +140.0	±0.15% FS	
	F01	69	0.0 to 100.0	0.0 to 200.0	±0.15% FS	
	F03	70	0.0 to 300.0	0.0 to 500.0	±0.1% FS	
	F05	71	0.0 to 500.0	0.0 to 900.0	±0.1% FS	
JIS'89JPt100	P50	96	–200.0 to +500.0	–300.0 to +900.0	±0.1% FS	
	P46	97	–200.0 to +200.0	–300.0 to +400.0	±0.1 % FS	
	P32	98	–100.0 to +150.0	–150.0 to +300.0	±0.1 % FS	
	P36	99	–50.0 to +200.0	–50.0 to +400.0	±0.1 % FS	
	P33	100	–40.0 to +60.0	–40.0 to +140.0	±0.15% FS	
	P01	101	0.0 to 100.0	0.0 to 200.0	±0.15% FS	
	P03	102	0.0 to 300.0	0.0 to 500.0	±0.1 % FS	
	P05	103	0.0 to 500.0	0.0 to 900.0	±0.1 % FS	

DC Current, DC Voltage

Input Type			Input Range (FS)		Accuracy (under standard conditions)	
Symbol	**Cod**	**Range No.**				
mA (linear)	Col	48	4 to 20 mA	Programmable range -19999 to +20000 (decimal point position can be changed)	+/-0.1%FS	
	Z51	52	2.4 to 20 mA		+/-0.1%FS	
mV	MO1	4	0 to 10 mV		+/-0.1%FS	
	L02	50	-10 to 10 mV		+/-0.1%FS	
		51	0 to 100 mV		+/-.15%FS	
mA (linear)	CO1	128	4 to 20 mA	Programmable range -19999 to +20000 (decimal point position can be changed)	+/-.15%FS	
	Z51	124	2.4 to 20 mA		+/-0.1%FS	
V (linear)		129	0 to 1V		+/-0.1%FS	
		130	-1 to +1V		+/-0.1%FS	
	Vol	131	1 to 5V		+/-0.1%FS	
		132	0 to 5V		+/-0.1%FS	
		133	0 to 10V		+/-0.1%FS	

Handling Precautions

- The unit of code Z06 is Kelvin (K).
- The PV lower limit alarm does not occur with codes F50 and P50.
- The number of digits past the decimal point for DC current and DC voltage is programmable within the range 0 to 4.

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курган (3522)50-90-47
Курск (4712)77-13-04
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Ноябрьск(3496)41-32-12
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Пермь (342)205-81-47
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саранск (8342)22-96-24
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
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Якутск (4112)23-90-97
Ярославль (4852)69-52-93

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