

GRAPHIC PROGRAM CONTROLLER (1CH)

DATA SHEET

PVH

The PVH is a multi-function/high performance program controller developed for temperature control on the base of the good sales records in various industrial machines fields. This controller can realize multifarious program controls with high accuracy, and it is applicable to multi-kind and small-quantity production machines.

To facilitate coping with FA systemization, the instrument is fully equipped with PLC (programmable logic controller) link function, so it is suitable as a component for CIM construction.

FEATURES

1. Fully equipped with monitoring and operating functions, using the full graphic indications.

- "Process name" corresponding to the time signal can be indicated.
- In indication of a temperature pattern, the scale of the axis of abscissa can be changed over from step to time, so its actual pattern can be indicated as it is.

2. 199 types (max. 2700 steps) of program patterns setting function

Suitable for a machine which requires a number of program patterns as in multi-kind and small-quantity production.

3. Adaption of memory cards

• Simple and exact program control

When programs for many kinds of products are stored in respective IC cards, the relevant program can be easily loaded by card replacement. Therefore, the program pattern control can be done simply and exactly at the field of multi-kind and small-quantity production.

• Speedily coping with replacement of existing PVN (PVN→ PVH)

Prepare a pattern transfer unit, and save the pattern data and PID parameters from the existing PVN to an IC card. By using this IC card, the new PVH can be easily initialized (The pattern transfer unit and IC card reader are required separately).

• Compact data base making (PVH→ PVH)

Save the pattern data and PID parameters from the PVH used conventionally to an IC card. By using this IC card, the new PVH can be easily initialized.

4. A number of time signals easy to use

Conventionally, each process is controlled in a combination of time signals. Adaption of the BCD code setting method permits each process to be controlled by numeric characters, assuring simple and exact setting.

5. Realization of wiring saving by the program controller direct-coupling link

(T-link communication: Option)

The program controller can be coupled with PLC, using only one twisted pair cable by the T-link communication.



Therefore, cost reduction can be achieved by wiring saving free of trouble some wiring work and careless wiring miss.

6. Coping with FA systemization

- The PVH serves for FA systemization in combination with a variety of Fuji FA components.
- The individual instruments are comprised in a network (T-link communication), which is high in extensibility. Therefore, the FA systemization can be promoted step by step like combination with PLC unit → group control of machines → FA control of overall shops.

7. Universal transmission: RS-485(option), RS-422A(option)

SPECIFICATIONS

- **Front size:** 144 x 144mm
- **Input types:** Full multiple (See the " Input part")
- **Control action:** PID action with auto tuning (direct/reverse changeover possible)
Manual operating function
Program/fixed value control
- **Control output:**
 - Relay contact
 - Voltage pulse output (for SSR drive)
 - Current output
- **IC card function (option):**
 - Program and parameters can be saved to IC card.
- **Indication system:**
 - LCD full dot graphic indication
 - 320 x 240dots (with back light)

} Designated the "Code symbols"

PROGRAM SETTING PART

- **Stored program count:** Max. 199 patterns

- **Maximum number of steps:**
2700 steps
- **Number of steps used for one pattern:**
Max. 99
- **Program setting range:**
Time; 0.0 to 999.9min/step
Setting resolution 0.1min
Setting range; 0 to 100% of input scale
- **Setting accuracy:**
±0.5% or less of full scale
- **Time fast feed function:**
About 60 times as fast as set time.
Time signal (DO) is turned OFF in case of fast feed by key operation.
- **Operation indication:**
The following conditions are indicated on the front LCD screen.
During program running, during program stop, during program fast feed, program reset, program end, selected program No., running step No., process variable (PV), set value (SV), manipulated variable (MV), manipulated output ON/OFF status, program run pattern, process names, time indication

INPUT PART

(1) Analog input

- **Input signal, and setting scale range:**

Kind of input	Code	Temperature range [°C]	Temperature range [°F]
Resistance bulb IEC Pub 751-1983	Pt 100	0	0.0 to 150.0
	Pt 100	1	0.0 to 300.0
	Pt 100	2	0.0 to 500.0
	Pt 100	3	0.0 to 600.0
	Pt 100	4	-50.0 to 100.0
	Pt 100	5	-100.0 to 200.0
	Pt 100	6	-199.9 to 600.0
Resistance bulb JIS C 1604-1981	JPt 100	16	0.0 to 150.0
	JPt 100	17	0.0 to 300.0
	JPt 100	18	0.0 to 500.0
	JPt 100	19	0.0 to 600.0
	JPt 100	20	-50.0 to 100.0
	JPt 100	21	-100.0 to 200.0
Thermocouple	J	32	0.0 to 400.0
	J	33	0.0 to 800.0
	K	34	0.0 to 400.0
	K	35	0.0 to 800.0
	K	36	0.0 to 1200.0
	R	37	0.0 to 1600.0
	B	38	0.0 to 1800.0
	T	39	-199.9 to 200.0
	T	40	-150.0 to 400.0
	E	41	0.0 to 800.0
	E	42	-199.9 to 800.0
	S	43	0.0 to 1600.0
	N	44	0.0 to 1300.0
	U	45	-199.9 to 400.0
WRe5-26	46	0.0 to 2300.0	
PL-II	47	0.0 to 1300.0	
DC voltage	1 to 5V DC	64	Scale settable within -999 to +9999 (*) To apply the current input, connect 250Ω (option) between terminal I1C and I1V to convert it into the voltage of 1 to 5V.
	0 to 5V DC	65	
	0 to 10V DC	66	
	0 to 1V DC	67	
	0 to 100mV DC	68	
	0 to 10mV DC	69	
DC current	4 to 20mA DC	64*	

- Note :
- The designated accuracy cannot be guaranteed at -200°C or less.
 - With the R thermocouple, the accuracy is ±1% FS (full scale) within the range of 0 to 500°C.
 - With the B thermocouple, the accuracy is ±5% FS within the range of 0 to 400°C.
 - With the resistance bulb input, UNDER-indication is not given within the range of -199.9 to 850 °C, even when the input becomes 0Ω.
 - With the resistance bulb input, UNDER-indication or OVER-indication is given if the B wire is disconnected.

- **Input resistance and allowable signal source resistance:**

Kind of input	Input resistance	Allow. input signal source resistance
Thermocouple	1MΩ or more	250Ω or less
Resistance bulb	—	10Ω or less per wire
Voltage input	1MΩ or more	1KΩ or less
4 to 20mA DC	External connection resistance 250Ω	—

- **Sampling cycle:** 0.1 sec
 - (2) **Digital input signal**
 - **Signal:** No voltage contact (contact capacity 12V DC, 2mA DC or more)
 - **Number of input points:** 15 points
 - Initial reset (RESET)
 - RUN/HOLD
 - Fast feed (FAST) or segment feed
 - Monitor panel changeover
 - Pattern request
 - External pattern selection ENT
 - External pattern selection 10⁰ (4 points)
 - External pattern selection 10¹ (4 points)
 - External pattern selection 10² (1 point)
- (depends upon the specification)

OUTPUT PART

(1) Control output

- **Control output:** Direct/reverse PID action
Proportional band (P); 0.0 to 999.9% (2-position action when P=0)
Integration time (I); 0 to 3200sec (integral cut when I=0)
Derivative time (D); 0.0 to 900.0 sec (derivation cut when D=0)
(9 kinds of PID are stored. One kind of PID can be set every step of program pattern)

- **Time proportional cycle:** 1 to 120sec (set resolution 1 sec) (with the current output, no setting is required)

- **Relay contact output:** 220V AC/30V DC, 3A (resistive load)
Normally open SPDT (1c) contact
Electrical expected life 10⁵
Minimum switching current 0.1A (24V DC)

- **SSR/SSC drive output:** ON: 10 to 18V DC
OFF: 0.5V DC or less
Max. current about 20mA

- **Current output:** 4 to 20mA DC (allowable load 600Ω or less)
Accuracy ±1.0% FS

- **Output limiter:** Upper/lower: limiter
Setting range: -5 to 105%
As for the limiter set values, 9 sets of upper/lower limit pairs are stored, and one kind of them can be set every step of the program pattern.

(2) Auxiliary analog output (option)

- **Number of output points:** 2
- **Output data:** Two points of any one of process variable, set value or manipulated variable can be set independently.

- **Output accuracy:**
±0.2% FS
 - **Kind of output:** Two points of any one of 1 to 5V DC, 0 to 5V DC, and 0 to 10V DC can be set independently by dip switch. (1 to 5V at delivery from the factory)
 - **Scaling function:**
Provided
- (3) Digital output**
- **Time signal:** 20 points
 - Open collector output
 - Output rating 24V DC, 10mA or less.
 - Setting is done every step.
 - END status output: 1 point
Open collector output
Output rating; 24V DC, 10mA or less
 - **Alarm:** 4 points (for upper/lower limit alarm : 2 points, for upper limit/lower limit alarm : 2 points)
Setting range; 0 to 100% FS
 - For the upper/lower limit alarm, up to 9 sets of upper limit and lower limit can be set independently, and one set can be designated every step selectively from among them.
 - For the upper limit, lower limit alarm, only one set of upper limit and lower limit can be set in common.
 - As for other alarms, guarantee-soak-maximum-wait-time alarm and main-unit-fault-alarm can also be set.

INDICATION FUNCTION

(1) Set value (SV), and process variable (PV) indications

- **Indication system:**
LCD indication
- **Indication range:**
0 to 100% FS (SV), -5 to 105% FS (PV)
- **Process variable indication accuracy:**
±0.2% FS ±1 digit (standard condition)
Reference cold junction temperature compensation error ±1°C (with thermocouple input)

(2) Program No. indication

- **Indication system:**
LCD indication (numeric indication)
- **Indication range:**
1 to 199

(3) Program running indication

- **Indication system:**
LCD graphic indication (numeric indication and graphic indication)
- **Indication range:**
Step No.1 to 99
Residual time or lapse time in each step, or program running total time 0 to 999.9 min.

(4) Digital I/O and operation indication

- **Indication system:** LCD indication
- **Indication items:**
Time signals (TS1 to TS20)
Operation indication (reset, run, stop, fast feed, end, control output)
Alarm (1 to 4) output status
IC card battery life alarm indication

ADDITIONAL FUNCTIONS

- **Transmission function:**
T-link (option), RS-485(option), RS-422A(option)
Remarks : When connecting RS-422A or RS-485 through RS-232C, be sure to use a converter.
The following shows recommended converters.
Maker : SYSTEM SACOM CORP., Tokyo, Japan
Tel : 03-3635-5145
Type : KS-10P for RS-422A
Type : KS-485 for RS-485
- **Auxiliary analog output:**
See the "Output part" (option).
- **Digital input function:**
External pattern selection (pulse input):
This function inputs pulses via external contact, increments pattern No., and selects a program pattern.
External pattern selection (3 digits of BCD code):
This function selects a pattern by 3 digits of BCD code.
Step/fast feed:
This function feeds a step forward (up to the start point of the next step) via external contact, or increases the program running speed about 60 times as high as the normal speed (this function is selected BY "Code symbols" designation).

OTHER FUNCTIONS

- **Cyclic run:** This function runs the same program pattern repeatedly.
- **Link run:** This function links one program pattern with another during run.

GENERAL ITEMS

- **RAS function:** With watchdog timer provided.
- **Remedial measure against power failure:**
A short break is of 20ms or more is regarded as power failure.
Automatic restart is made after power recovery.
- **Battery backup:**
Lithium battery is used.
Battery life: 5 years expected at an ambient temperature of 0 to 40°C, unless energized.

PARTICLES TO BE ARRANGED SEPARATELY

- **Pattern transfer unit**
This unit is used to save the pattern data, PID parameters and other various data stored in the conventional model PVN to an IC card. Since the data format of the data in this IC card is not applicable directly to the PVH, it should be subjected to data conversion processing by the data converter software attached to the pattern transfer unit. The pattern data or the like stored in this IC card can be loaded to the PVH after subjected to this conversion processing. The processing procedure is summarized below.
(a) Save the pattern data in the conventional model PVN to an IC card by the pattern transfer unit.

(b) Convert the IC card data from PVN format to PVH format (necessary tools: Personal computer and IC card reader/writer).

(c) Load the pattern data from the IC card to PVH.

Necessary tools (to be prepared by user)

Personal computer: Model FMR
 Fujitsu Ltd. or PC9801 (NEC Corp.)
 and MS-DOS (Ver. 3.10 or more)
 IC card reader/writer : Model, MCRJ03
 (Towa Electron Co., Ltd.)

• **Comment loader**

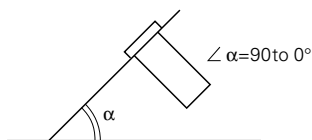
The comment loader is a software used to register character strings of process names or comments in an IC card for PVH. Thus "current process name" corresponding to the time signal can be indicated on PVH

Specification: Japanese characters 18 characters/1 process

Personal computer: Model FMR
 Fujitsu Ltd., or PC9801 (NEC Corp.)
 and MS-DOS (Ver. 3.10 or more)
 IC card reader/writer : Model, MCRJ03
 (Towa Electron Co., Ltd.)

OPERATING CONDITIONS

- **Power supply:**85 to 132V AC (50/60Hz)
 170 to 264V AC (50/60Hz)
 (selected by "Code symbols" designation)
- **Power consumption:**
 About 20VA
- **Ambient temperature:**
 0 to 50°C (storage temperature : -10 to +60°C)
- **Ambient humidity:**
 90% RH max.
- **Mounting angle:**



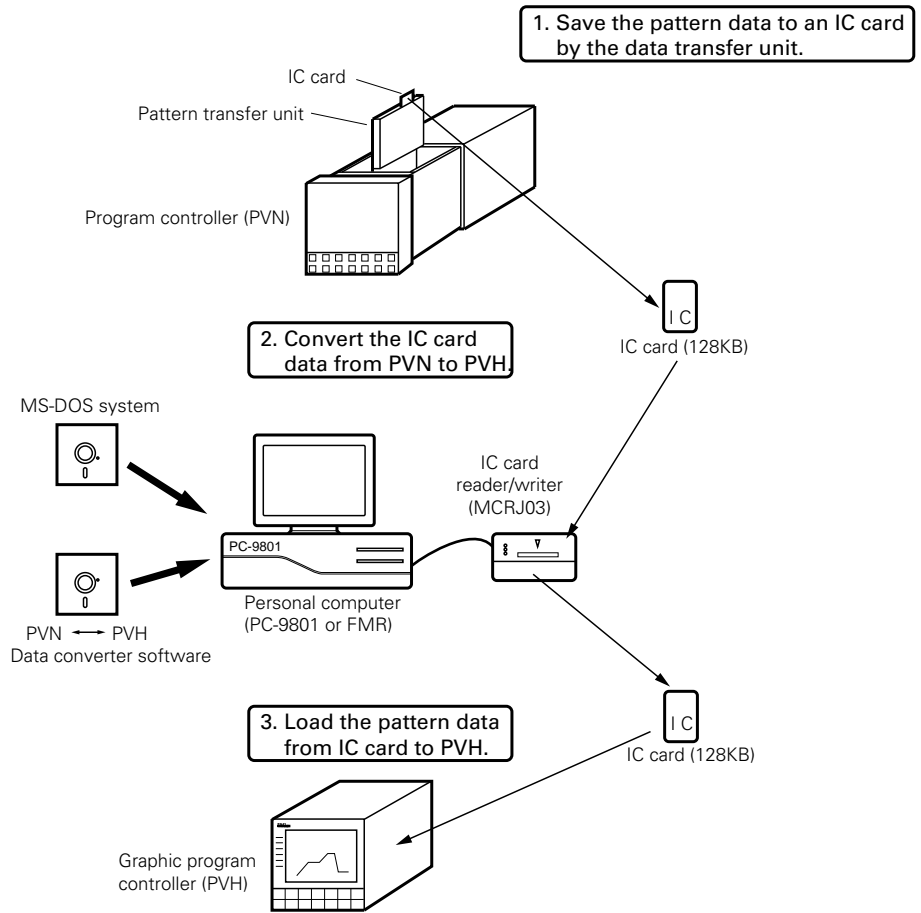
STRUCTURE

- **Enclosure type:**
 Case: steel plate (dust-proof)
 Front door: ABS resin (with packing)
 External terminal cover: ABS resin
- **External dimensions (H x W x D):**
 144 x 144 x 237mm
- **Construction:** Flush panel type
- **Mass{weight}:** About 3.1kg
- **External colors:**
 Case; N1.5 (black)
 Front door; N1.5 (black)

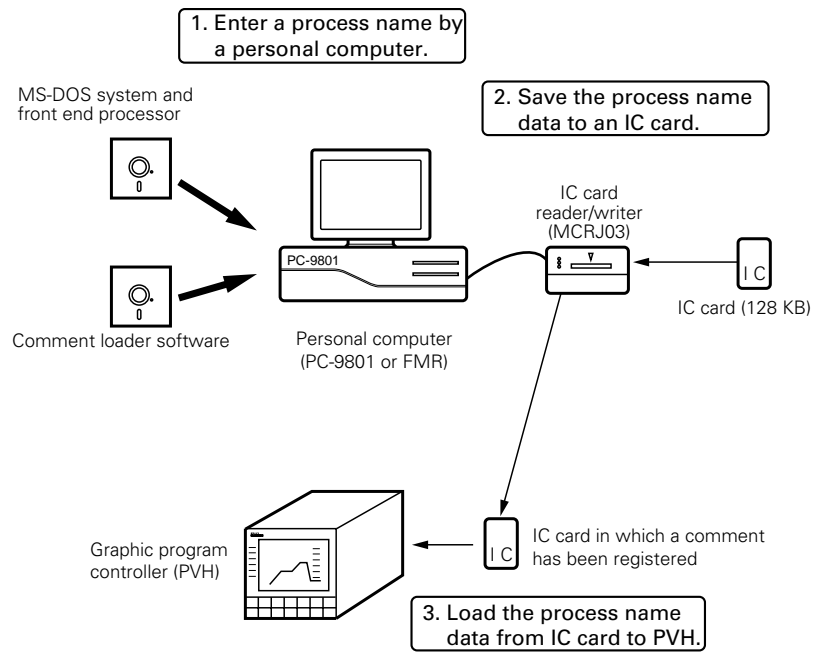
CODE SYMBOLS

1	2	3	4	5	6	7	8	9	10	11	12	13	Description
P	V	H	0	0	1								Control output
													Relay contact output
													SSR/SSC drive output
													4 to 20mA DC output
													Power supply
													85 to 132V AC, 50/60Hz
													170 to 264V AC, 50/60Hz
													Auxiliary analog output
													Without
													Provided
													Note: 1 to 5V DC at delivery from the factory
													Transmission function
													Without
													RS-422A
													RS-485
													T-link (directly coupled with Fuji programmable logic controller)
													DI function selection
													Fast feed + BCD code selection
													Step feed + BCD code selection
													Fast feed + pulse input selection
													Step feed + pulse input selection
													IC card attached (1 sheet)
													Without
													Provided
													Graphic indication, name plate and instruction manual
													Japanese
													English

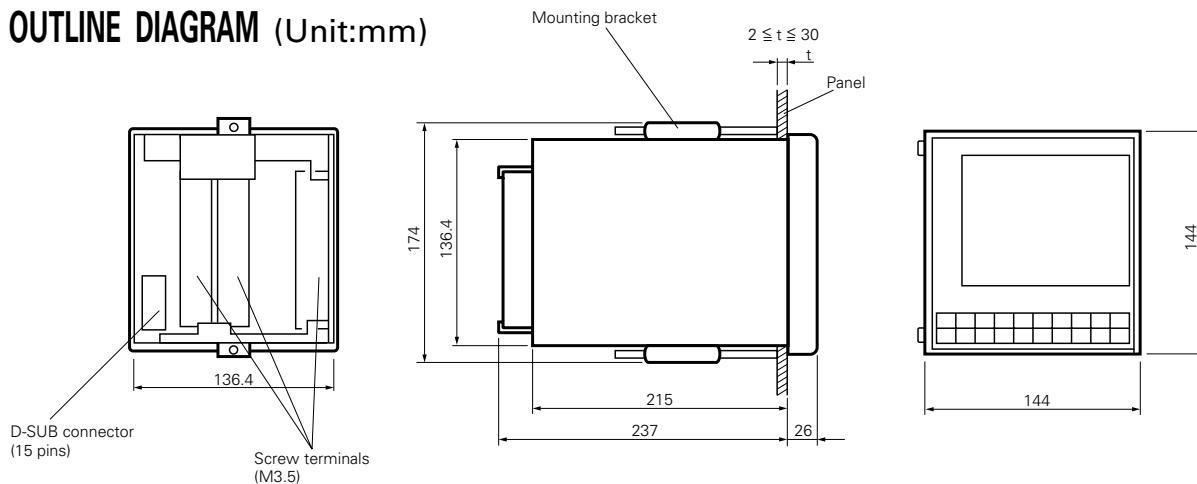
- Transfer method of the pattern data from the conventional model PVN to PVH



- Entering method a process name

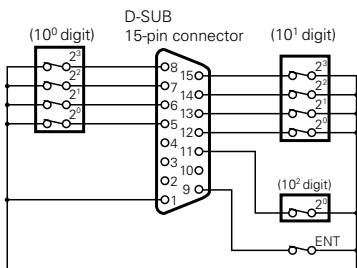


OUTLINE DIAGRAM (Unit:mm)

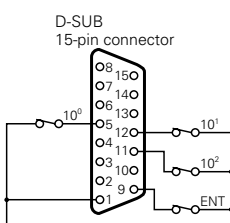


CONNECTION DIAGRAM

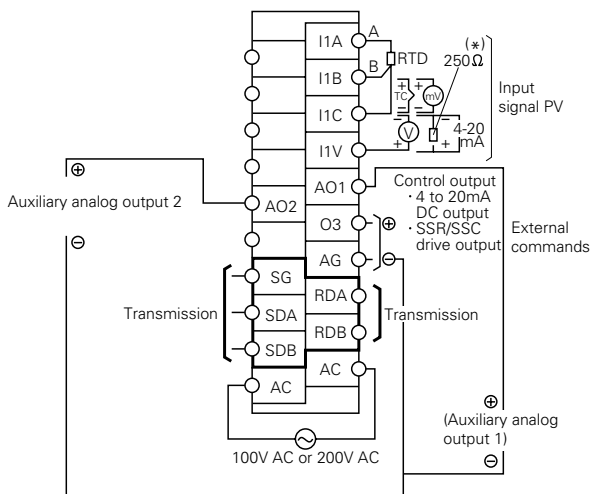
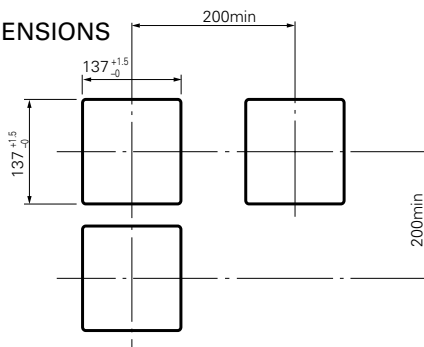
External pattern selection input (BCD code)



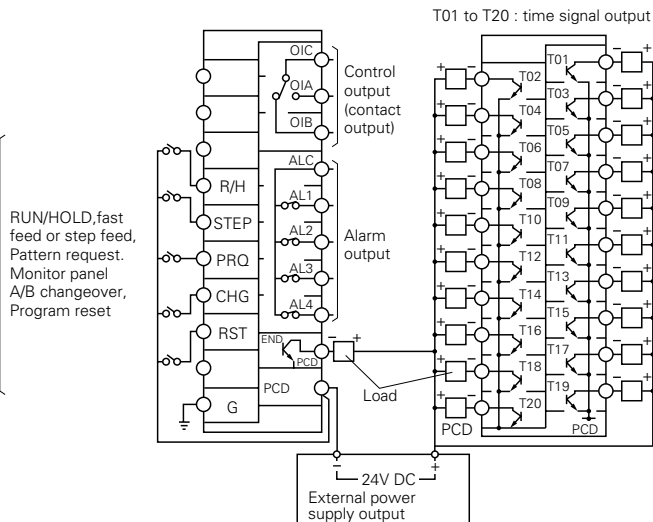
External pattern selection input (pulse input)



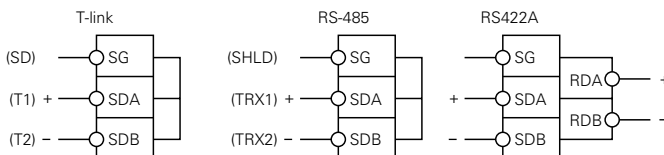
PANEL CUTOUT DIMENSIONS



Note: Nothing should be connected to a blank terminal.
 Note: *With the 4 to 20mA DC input, connect a 250Ω resistor here.



Note: Transmission terminals connections.



⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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