

Description

The TD-SP is a digital temperature display module for Independent Energy "SP" series of temperature controls. The standard model displays temperature in °F or °C. The TD-SP will work with the following models:

- SP-32, SP-33, SP-34** Single stage controls
- SP-32D, SP-33D, SP-34D** Single stage controls (DPDT output)
- SP-322, SP-332, SP-342** Dual stage controls
- SP-32DT, DTC-90** Temperature/defrost controls

The TD-SP can snap into the cover of any SP control, or can be mounted up to 200 feet away from the control. Cables and wall mounting plates are available. Also, the TD-SP can be used as a service tool for all systems with SP controls.

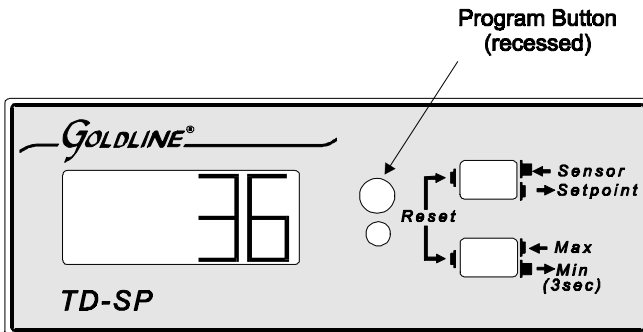
The TD-SP continuously displays the control sensor temperature. When the TD-SP is directly mounted on the cover of an SP control the control setpoint can be adjusted using the 1/8" Allen wrench provided through the access hole in the cover of the TD-SP. Combining this feature with the ability to display the setpoint by pressing the upper pushbutton allows the user to adjust the setpoint very accurately.

The TD-SP also stores in memory the highest and lowest sensor temperatures. The highest temperature (max) is displayed by depressing the lower pushbutton. The lowest temperature (min) is then displayed for 3 seconds immediately after the lower pushbutton is released. The max/min memory is "cleared" to the current temperature by pressing the upper pushbutton while holding the lower pushbutton. Note that the max/min temperatures are retained in memory even if power is removed from the TD-SP.

Specifications

- Display Range:** -26°F to +230°F
-32°C to +110°C
- Accuracy:** ±1°F
- Resolution:** 1°F or 0.5°C
- Out of Range:** displays "HI" or "LO"

- Operating Environment:** 15°F to 130°F
0-95% rH
- Connection:** All power and signals connected through 10 conductor cable to SP control. No other connections.
- Dimensions:** 4.25" x 1.75" x 1.62" overall
3.94" x 1.50" cutout for panel mounting



Installation

A. Direct mounting on SP control

1. Disconnect power from SP control
2. Remove the setpoint access panel from the control cover.
3. Feed TD-SP cable through the cover and out the wiring access of the left side. Insert the TD-SP into the cover and press in until seated.
4. Plug the TD-SP ribbon cable into the connector on the control and push excess cable back into the control.
5. Restore power and check operation of the control. The setpoint can be adjusted using the 1/8" Allen wrench through the access hole in the TD-SP.

B. Panel Mounting

1. Cut a 3.94" x 1.5" (3 15/16" x 1 1/2") rectangular opening in the panel. Panel thicknesses from .030" to .190" (3/16") are suitable.
2. Use a model **ABC-10F/10M** cable to connect the TD-SP to the SP series control. This cable must be ordered separately from Independent Energy and is available in any length up to 200 feet. Consult IE when using cables longer than 50 ft.

C. Wall mounting

1. The **MK-1** wallplate allows the TD-SP to be flush mounted on a wall over a 3 gang electrical box. Alternatively, the **MK-2** bracket allows the TD-SP to be mounted onto a wall without penetrating the wall surface. Both the MK-1 and MK-2 mounting plates must be ordered separately.

°F/°C Selection

The TD-SP control is shipped from the factory with the display set to °F. You can check this by verifying that no decimal point is displayed. (The °C display always includes a decimal point.) To change the current setting:

1. Reset the TD-SP by pressing both pushbuttons for 2 seconds. While the "-188.8" LCD test pattern is displayed, press the programming button (recessed, upper hole next to display) with a blunt object. "°FC" will be displayed.
2. To verify the current setting, simply push the lower pushbutton.

3. To change the current setting, press the programming button again. The current setting will be displayed ("°F " or "°C"). Pressing either pushbutton will cause the TD-SP to switch from one setting to the other.

4. To memorize the selection as displayed, push the programming button one more time and then reset the TD-SP by holding both pushbuttons for 2 seconds. The TD-SP will retain the setting, even if power is interrupted.

Operation

1. The TD-SP continuously displays the SP control's sensor temperature.
2. To display setpoint temperature: Press and hold the upper pushbutton.
3. To display the highest (maximum) temperature reached by the control sensor since the last reset press and hold the lower pushbutton.
4. To display the lowest (minimum) temperature reached by the control sensor since the last "clear" press the lower pushbutton and then release it. The minimum temperature will be displayed for approximately 3 seconds and then the

display will automatically revert to reading the current sensor temperature.

5. To "clear" the high/low (max/min) temperature memory: Press the upper pushbutton while holding the lower pushbutton. Both maximum and minimum temperatures are set to the current sensor temperature.

6. To adjust the SP control setpoint (when the TD-SP is mounted on the control): Use a 1/8" Allen wrench (provided with the TD-SP) through the opening (marked "setpoint access") in the TD-SP.

Troubleshooting

There are no setup parameters to set or other adjustments required for the TD-SP to operate properly. You should be able to remove the TD-SP from the box, plug it into a SP control and immediately display the sensor temperature.

If you have a problem:

1. For **“no display”** condition check that power is connected to the SP control and that the SP control is operating properly. Next check the wiring connection between the TD-SP and the SP control. Lastly, turn power off, wait 1 minute and then reapply power. If there still is a problem the TD-SP will have to be returned for repair

2. For **“partial displays”** or general **“erratic”** operation: Turn power off, wait 1 minute, and then reapply power. If there still is a problem, the TD-SP will have to be returned for repair.

3. For temperature displays that **“bounce”** between several different values: Check that the sensor lines are not near other electrical cabling, use shielded sensor wire if required.

4. For **“erroneous”** readings check that the sensor is making good thermal contact with whatever is being measured and that the sensor is insulated from ambient temperatures. If the sensor is in a wet (constantly condensing humidity), moisture may, over time, enter the sensor body and result in errors. If this is the case, replace the sensor.

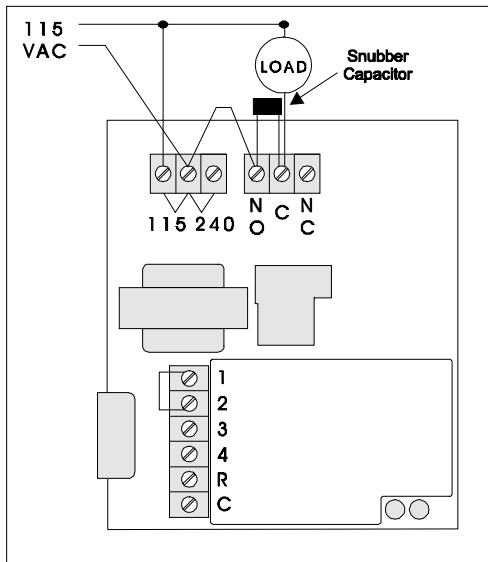
As a last resort, unwire the sensor from the SP control, measure the resistance with an ohmmeter and lookup the corresponding temperature on an IE “resistance vs. temperature” chart (see back). This will allow you to determine whether the sensor or the TD-SP is causing the error. If it is the TD-SP, then return the unit to IE for repair.

Snubber Capacitor

Inductive loads such as solenoid valves and contactor coils can generate large voltage “spikes” on the AC line. Occasionally, these spikes can cause problems with the TD-SP display unit (typically blank displays or displays with missing segments).

To prevent any problems, install the enclosed snubber capacitor directly across the “C” and

“NO” terminals (or “NC” if you are using the normally closed contacts) as shown in the diagram below. The capacitor is rated for use on 24, 115, and 240VAC loads. If you have any questions, please call Independent Energy technical service at 800-343-0826.



Technical Assistance

For help in installing, operating, or troubleshooting this control you may call for technical assistance at **800-343-0826**. Independent Energy's technicians are available from 8:00AM — 5:00PM

Eastern Time, Monday through Friday. You may call at other times and leave a message, and a technician will call you back as soon as possible.

Temperature vs. Resistance

All Goldline controls use 10K thermistor sensors. When disconnected from the control the sensor will read 10 K ohms at 25°C/77°F. Refer to the chart below for the resistance at other tempera-

tures. For a given temperature, the resistance reading should be accurate to +/- 1%. For a given resistance reading, the temperature reading should be accurate to +/- 0.5°F.

°F	OHM	°F	OHM	°F	OHM	°F	OHM	°F	OHM	°F	OHM	°F	OHM
-50	491,142	0	85,387	50	19,900	100	5,827	150	2,044	200	829	250	378
-49	472,642	1	82,719	51	19,377	101	5,697	151	2,005	201	815	251	373
-48	454,909	2	80,142	52	18,870	102	5,570	152	1,966	202	802	252	367
-47	437,907	3	77,656	53	18,377	103	5,446	153	1,929	203	788	253	362
-46	421,602	4	75,255	54	17,899	104	5,326	154	1,892	204	775	254	357
-45	405,965	5	72,937	55	17,435	105	5,208	155	1,856	205	763	255	352
-44	390,966	6	70,698	56	16,985	106	5,094	156	1,821	206	750	256	347
-43	376,577	7	68,535	57	16,548	107	4,982	157	1,787	207	738	257	342
-42	362,770	8	66,447	58	16,123	108	4,873	158	1,753	208	726	258	337
-41	349,522	9	64,428	59	15,711	109	4,767	159	1,720	209	714	259	332
-40	336,804	10	62,479	60	15,310	110	4,664	160	1,688	210	702	260	327
-39	324,597	11	60,595	61	14,921	111	4,564	161	1,657	211	691	261	323
-38	312,876	12	58,774	62	14,543	112	4,464	162	1,626	212	680	262	318
-37	301,622	13	57,014	63	14,176	113	4,368	163	1,596	213	669	263	314
-36	290,813	14	55,313	64	13,820	114	4,274	164	1,567	214	658	264	309
-35	280,433	15	53,669	65	13,473	115	4,183	165	1,538	215	648	265	305
-34	270,460	16	52,078	66	13,136	116	4,094	166	1,509	216	637	266	301
-33	260,878	17	50,541	67	12,809	117	4,007	167	1,482	217	627	267	296
-32	251,670	18	49,054	68	12,491	118	3,922	168	1,455	218	617	268	292
-31	242,821	19	47,616	69	12,182	119	3,839	169	1,428	219	607	269	288
-30	234,316	20	46,225	70	11,882	120	3,758	170	1,402	220	598	270	284
-29	226,138	21	44,879	71	11,589	121	3,679	171	1,377	221	588	271	280
-28	218,276	22	43,577	72	11,305	122	3,602	172	1,352	222	579	272	276
-27	210,716	23	42,318	73	11,029	123	3,527	173	1,328	223	570	273	273
-26	203,445	24	41,099	74	10,761	124	3,454	174	1,304	224	561	274	269
-25	196,451	25	39,919	75	10,500	125	3,382	175	1,281	225	553	275	265
-24	189,722	26	38,777	76	10,246	126	3,312	176	1,258	226	544	276	262
-23	183,248	27	37,671	77	9,999	127	3,244	177	1,235	227	536	277	258
-22	177,019	28	36,601	78	9,758	128	3,177	178	1,213	228	527	278	255
-21	171,023	29	35,565	79	9,525	129	3,112	179	1,192	229	519	279	251
-20	165,251	30	34,561	80	9,297	130	3,049	180	1,171	230	511	280	248
-19	159,696	31	33,590	81	9,076	131	2,987	181	1,150	231	503	281	244
-18	154,347	32	32,648	82	8,861	132	2,926	182	1,130	232	496	282	241
-17	149,197	33	31,737	83	8,651	133	2,867	183	1,110	233	488	283	238
-16	144,236	34	30,853	84	8,447	134	2,809	184	1,091	234	481	284	235
-15	139,458	35	29,998	85	8,249	135	2,752	185	1,072	235	473	285	232
-14	134,855	36	29,169	86	8,056	136	2,697	186	1,054	236	466	286	229
-13	130,420	37	28,365	87	7,867	137	2,643	187	1,035	237	459	287	225
-12	126,147	38	27,587	88	7,684	138	2,591	188	1,017	238	452	288	223
-11	122,030	39	26,832	89	7,506	139	2,539	189	1,000	239	445	289	220
-10	118,061	40	26,100	90	7,333	140	2,489	190	983	240	439	290	217
-9	114,235	41	25,391	91	7,164	141	2,440	191	966	241	432	291	214
-8	110,547	42	24,704	92	6,999	142	2,392	192	950	242	426	292	211
-7	106,991	43	24,037	93	6,839	143	2,345	193	933	243	420	293	208
-6	103,561	44	23,391	94	6,683	144	2,299	194	918	244	413	294	206
-5	100,254	45	22,764	95	6,530	145	2,254	195	902	245	407	295	203
-4	97,063	46	22,156	96	6,382	146	2,210	196	887	246	401	296	200
-3	93,986	47	21,566	97	6,238	147	2,167	197	872	247	395	297	198
-2	91,017	48	20,993	98	6,097	148	2,125	198	857	248	390	298	195
-1	88,152	49	20,438	99	5,960	149	2,084	199	843	249	384	299	193
												300	190