

FANUC Series 31i-MODEL A

15.1 200 1 200

8:51 10:02

1999

Label	Value
X	0.0000
Z	0.0000
Y	0.0000
C	0.0000
A	0.0000
E	0.0000



HOW

F B

Figure 1

C 360,000 A 0,000
E 0,000

0	0500	
H	00000051	
I	5959	
S	3500	HD
F	0.10000000	
000	10	40
054	00	97
090	69.1	13.1

ES-02 SPARKING TEST OF SE — STANDARD METHOD

1







1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26








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160 G90 G97 F3500 ;
165 G0 Z-0.0 Y0 M43 S3500 P12 ;
170 G0 X41.0 C0 R28 ;
171 (CYCLE HERE) ;
172 G111 G0.5 H2. 11. J20.5 L-6.
    C1. F125. P0.5 Z11. A0.5 S125.
    D0.5 E125. U1.5 V118. W0.451 ;
173 M98 P506 (CROSS DRILL 1.5) ;
174 G0 X100.0 ;
175 G28 U0. V0. M45 ;
176 R09 ;
177 R1 ;

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Cnc Programming Guide

Tran Thanh



Cnc Programming Guide:

CNC Programming Handbook Peter Smid,2003 Comes with a CD ROM packed with a variety of problem solving projects

7 Easy Steps to CNC Programming... a Beginner's Guide David S. Hayden,2003 **CNC Programming**

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CNC Programming Handbook Peter Smid,2000 This handbook is a comprehensive guide to CNC programming covering virtually all CNC programming subjects in exceptional detail Both milling and turning topics are discussed with nearly 1 000 illustrations tables formulas and actual examples Besides being an invaluable in depth reference this book is well suited for use as a basic text in a wide variety of CNC training programs [7 Easy Steps to CNC Programming](#) David S. Hayden,2002 **CNC Lathe machine guide: Practical programming examples** Tran A_,2024-10-01 CNC Lathe machine guide Practical programming examples is the ultimate resource for anyone looking to master CNC lathe programming This book provides clear step by step examples that will help you understand the core concepts of CNC lathe operations and how to apply them effectively in real world scenarios Whether you re a beginner or an experienced machinist this guide breaks down complex programming techniques into simple easy to follow instructions With practical examples and tips you ll learn how to optimize your CNC lathe machine s capabilities improve precision and increase productivity Ideal for students professionals and hobbyists alike this book is your go to reference for mastering the art of CNC lathe programming and taking your machining skills to the next level **Beginner's Guide CNC Programming** ,2024 [7 Easy Steps to CNC Programming . . . Book II](#) David S. Hayden,2003 *7 Easy Steps to CNC Programming Book II Beyond the Beginning* is the second book in a series of introductory books on CNC Programming This book picks up where *Easy Steps to CNC Programming A Beginner s Guide* leaves off This books has a Frequently Asked Questions sections advanced information on

Coordinates systems NURBS how to select a CAM system How to hire programmers etc **Guide to Lathe by Examples**
Thanh Tran,2019-07-26 Contents 1 CNC Turning Center Programming Example2 G02 G03 Programming Example3 Fanuc G71 Turning Cycle4 Fanuc G71 G72 G70 Canned Cycle CNC Lathe Internal Machining Example Boring Facing 5 CNC Lathe Basic Programming Example ID OD Turning Boring Operations No Canned Cycle Used 6 Haas G72 Type I Rough and G70 Finish Facing Cycle Program Example Fanuc Compatible7 Fanuc Lathe Programming Example Using G70 G71 G74 for ID Machining8 CNC Lathe Programming Exercise Fanuc G71 Turning Cycle G74 Peck Drilling Cycle9 CNC Arc Programming G02 G03 Example10 G71 Rough Turning Cycle Example Code CNC Lathe Programming11 CNC Lathe Simple G Code Example G code Programming for Beginners12 Fanuc Circular Interpolation G02 G Code Example13 Newbie CNC Machinists a Basic CNC Canned Cycle Example G9014 Fanuc G73 Pattern Repeating Cycle CNC Program Example Code15 Fanuc G73 Pattern Repeating Canned Cycle Basic CNC Sample Program16 G28 Reference Point Return CNC Lathe17 G71 Longitudinal Roughing Cycle Mazak CNC Basic Programming Example18 Fanuc G72 Facing Canned Cycle Example Program19 Sample Program Example Fanuc G72 Facing Cycle Single line format20 Chamfer and Radius Program Example with G0121 Fanuc G94 Facing Cycle CNC Example Program22 Internal Threading on Fanuc 21i 18i 16i with G76 Threading Cycle23 External Thread Cutting with G76 Threading Cycle on Fanuc 21i 18i 16i CNC24 G01 Chamfer and Corner Rounding a CNC Program Example25 G02 G03 G Code Circular Interpolation Example Program26 Taper Turning with G90 Modal Turning Cycle CNC Example Code27 G90 Turning Cycle Fanuc CNC Program Example Code28 Haas G71 Example Program29 Face Grooving with G74 Peck Drilling Cycle CNC Programming Tutorial30 Taper Threading with G32 a CNC Programming Example31 G75 Canned Cycle Grooving CNC Programming Example32 CNC Circular Interpolation Tutorial G02 G0333 CNC Programming Example G92 Taper Threading Cycle34 G76 Thread Cycle a CNC Programming Example35 Fanuc CNC Lathe Programming Example36 CNC Programming Example G Code G02 Circular Interpolation Clockwise37 CNC Programming Example in Inch Simple CNC Lathe Program38 CNC Program Example G03 Circular Interpolation39 Fanuc G21 Measuring in Millimeter with CNC Lathe Programming Example40 Fanuc G20 Measuring in Inches with CNC Program Example41 Fanuc G76 Thread Cycle for Dummies42 Fanuc G70 G71 Rough and Finish Turning Cycle Program Example43 Multi Start Threads with Fanuc G76 Threading Cycle44 CNC Arc Programming Exercise45 Fanuc G75 Grooving Cycle CNC Program Example46 CNC Fanuc G73 Pattern Repeating Cycle CNC Program Example47 CNC Programming Example with Fanuc G71 Rough Turning Cycle and G7048 CNC Programming for Beginners a Simple CNC Programming Example49 CNC Fanuc G72 Canned Cycle Facing50 Lathe CNC Programming Example51 CNC Programming for Beginners a CNC Programming Example52 Simple CNC Lathe Drilling with Fanuc G74 Peck Drilling Cycle53 Tapered Threading with Fanuc G76 Threading Cycle54 Fanuc CNC Program Example55 CNC Lathe Programming Example CNC Programming Tutorials: G & M Code Examples Tran A_,2024-09-25 CNC Programming Tutorials G M Code Examples CNC Programming Tutorials G M Code Examples is your

comprehensive guide to mastering the language of CNC machines Whether you re a novice stepping into the world of computer numerical control or an experienced machinist seeking to refine your skills this book provides a clear hands on approach to programming with G code and M code Inside you ll discover Step by step tutorials Progress from beginner to advanced levels with clear explanations and illustrative examples Essential G code and M code commands Learn the core building blocks of CNC programming for precise tool movements and machine control Practical applications Explore a wide range of machining operations including drilling milling turning threading and more Real world examples Gain insights into industry standard practices with code examples for various CNC applications Troubleshooting tips Learn to identify and resolve common programming errors ensuring efficient and accurate machining This book covers Beginner intermediate and advanced CNC programming techniques Specific G code and M code commands and their applications Machining operations such as drilling milling turning threading and tapping CNC lathe and milling machine programming Practical examples and exercises to reinforce learning Whether you re a student hobbyist or professional CNC Programming Tutorials G M Code Examples empowers you to confidently program CNC machines and turn your designs into reality

CNC Machining Handbook: Building, Programming, and Implementation Alan Overby, 2010-10-06 A Practical Guide to CNC Machining Get a thorough explanation of the entire CNC process from start to finish including the various machines and their uses and the necessary software and tools CNC Machining Handbook describes the steps involved in building a CNC machine to custom specifications and successfully implementing it in a real world application Helpful photos and illustrations are featured throughout Whether you re a student hobbyist or business owner looking to move from a manual manufacturing process to the accuracy and repeatability of what CNC has to offer you ll benefit from the in depth information in this comprehensive resource CNC Machining Handbook covers Common types of home and shop based CNC controlled applications Linear motion guide systems Transmission systems Stepper and servo motors Controller hardware Cartesian coordinate system CAD computer aided drafting and CAM computer aided manufacturing software Overview of G code language Ready made CNC systems

Getting Started with CNC Tran Thanh, 2019-04-23 CNC Programming Tutorials Guide To Step by Step CNC Machine1 CNC Programming Basics2 CNC Modes Controls3 CNC Operating4 CNC Machine Set Up5 CNC Lathe Intro

Cnc Programming for Milling Machines Kelly Curran, Jon Stenerson, 2016-05-03 This book covers CNC programming speeds and feeds carbide tooling selection and use workholding and machine setups The practical understandable step by step approach makes learning how to program a CNC machining center milling machine a much easier and less frustrating task All standard M and G codes as well as canned cycles are covered There are many practical examples and fully explained line by line programming examples Each chapter has questions and programming assignments to guide learning The answers to questions and programming are included in an Appendix Additional Appendices contain typical M and G codes as well as those for Mach3 programming

The CNC Handbook Hans Bernhard Kief, Helmut A.

Roschiwal, Karsten Schwarz, 2021-11-15 Introducing computers into production engineering has drastically reduced the artisan skill content traditionally required in manufacturing processes and replaced it with high precision computer controlled machinery. While this reduces human error and variability in output, it does not eliminate the knowledge required of the professional engineer or shop floor worker. On the contrary, the reverse is true. Managers, engineers, and workers still need to understand the fundamentals while they need to acquire other skills. These highly regarded authors combine more than 150 years of industrial and academic experience and expertise to provide readers with the fundamentals of the subject from digital manufacturing with CNC machine tools and FMS up to Industry 4.0, emphasizing the increased importance of automated manufacturing based on computerized systems: CAD, CAM, CAQ, etc. Features: This groundbreaking work introduces readers to CNC fundamentals, followed by a number of chapters which explain how different components are applied in practice. This logical approach is extended to the study of CNC and drives tooling, flexible manufacturing systems, FMS, and finally to NC programming, DNC, digital manufacturing, Industry 4.0, and computer integrated manufacturing, CIM. Additional chapters cover industrial robots, additive manufacturing, energy efficient manufacturing, simulation systems, state of the art of machine integrated measuring systems, and using touch probes and laser beams. Explains the functions and connections of all integrated components. **CNC MACHINING CERTIFICATION EXAM GUIDE** Ken Evans, 2019

Resources in Education, 1992-05 *CNC Fundamentals & Solidcam Programming* Hokama Jun, 2025-03-04 Master the art of CNC machining and programming with CNC FUNDAMENTALS SOLIDCAM PROGRAMMING, the ultimate resource for beginners and professionals alike. This book provides a clear step by step introduction to Computer Numerical Control (CNC), covering everything from foundational concepts to advanced SolidCAM programming techniques. Inside you will discover: CNC Basics: Understand machine types, coordinate systems, tooling, and workholding strategies. G Code Mastery: Learn essential commands for programming CNC machines with precision. SolidCAM Programming: Explore CAD/CAM integration, toolpath creation, and machining strategies. Real World Applications: Apply your knowledge to practical machining projects and real manufacturing scenarios. Why You Should Buy This Book: Comprehensive Learning. Whether you're new to CNC or looking to refine your skills, this book covers everything from the basics to advanced SolidCAM techniques. Practical Approach: With step by step instructions and real world examples, you will gain hands on experience to confidently program and operate CNC machines. Industry Relevant Knowledge: Learn modern machining strategies used in today's manufacturing industries, making you a valuable asset in the field. Easy to Understand Explanations: Complex topics are broken down into simple, digestible sections, making it easier to learn and apply CNC programming concepts. Perfect for Students, Machinists, and Engineers: Whether you're studying CNC machining, working in the industry, or looking to upgrade your skills, this book is designed for all experience levels. **Turning Center Programming** Mike Lynch, 2013-09-25 THIS EDITION CONTAINS ANSWERS TO EXERCISES. CNC turning centers are very popular in manufacturing companies. Just about every company that

performs metal cutting operations has at least one. Since they are so popular, people beginning their CNC careers are often exposed to turning centers early on. This makes learning about them an excellent first choice for people beginning their careers in CNC. This self-study manual is for people who want to learn G-code level manual programming for CNC turning centers. It is the companion manual to the Turning Center Setup and Operation self-study manual. We assume in this text that you understand certain things about basic machining practices, topics that are addressed in the Turning Center Setup and Operation manual. This text can also be used by people that have some shop experience who are not interested in learning about how turning centers are set up or how production runs are completed.

Beginner Level CNC Program Examples

Tran A., In this book we bring you examples of CNC programs from simple to complex. Hope the book will help those who are just starting out with CNC programming.

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